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Monthly Message

One of the important groups in this office, the Dental Advisory Committee, does its work quietly and efficiently. The Committee came into being at the suggestion of Dr. Daniel Lynch, a Past-President of the American Dental Association. Each year the Association is asked to submit to this office a panel from which to select members of the Committee, which consists of the dental member of the Medical Advisory Council to this office, Dr. Thomas P. Fox, as chairman, three members appointed by this office from the American Dental Association nominations (usually the President-Elect of the Association is one of these), and the three Dental Chiefs of the military departments.

Since November 1955 this Committee has held eight meetings and has considered subjects pertaining to the dental profession: personnel; materiel; planning for dental clinics; and the operation of Public Law 569, the "Medicare Act"—reporting to the Advisory Council to the Assistant Secretary of Defense on the one hand and on the other, to the Dental Advisory Committee to Major General Paul I. Robinson, MC, USA, the Executive Director for the operation of the law. The Committee also cooperates with the American Dental Association and the Association of American Dental Colleges in the compilation of the Senior Dental Questionnaire, and advises on the problem of foreign and American manufacture of dental equipment. Members of the Committee have taken many trips out into the field, so that their recommendations are based upon firsthand observation and knowledge.

Dentistry is a part of the medical sciences and was in bygone years an integral part of medicine itself. The practice of dentistry is quite different, however, and has its own problems. It is with special pleasure, therefore, that I bring the work of this Committee to the attention of the dental and medical professions, that they may appreciate the work the Committee performs and the questions with which it deals.

Frank B. Berry

FRANK B. BERRY
Assistant Secretary of Defense
(Health and Medical)

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Foreword

The *United States Armed Forces Medical Journal* is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers, and officers of the Veterinary Corps of the Armed Forces, and the medical consultants of the Army, Navy, and Air Force to submit manuscripts for publication in this *Journal.*

FRANK B. BERRY, M. D.,
Assistant Secretary of Defense (Health and Medical).

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Surgeon General, United States Navy.

MAJOR GENERAL DAN C. OGLE,
Surgeon General, United States Air Force.

UNITED STATES ARMED FORCES
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AN EPIDEMIC OF PLEURISY WITH EFFUSION IN BITLIS, TURKEY

Study of 559 Cases

FAHRETTIN ALPTEKIN, *Captain, Turkish Army Medical Corps*

IN 1955 an outbreak of an acute illness, characterized by basal pleurisy with effusion and typically following a benign course, occurred among the soldiers at Bitlis Garrison in Turkey. All cases differed from other types of pleurisy, especially in the common occurrence of basal pleurisy with effusion and in special features of the pleural fluid. My preliminary report[1] concerned cases observed in the first three months. This article presents a clinical description of the 559 cases seen over a period of 11 months, with a discussion of the differential diagnosis. Eight additional cases of pleurisy of the classical type were excluded from this study.

OCCURRENCE OF CASES

After February 1955, patients with pleurisy with effusion were increasing in number every day, all men between 20 and 25 years of age. On some days there were as many as 20 new admissions to this hospital. There was no epidemic of any other disease among the soldiers either during or immediately before the outbreak of pleurisy.

The disease was first observed in the infantry regiment. Later it appeared in other units that did not have the same water supply and did not use the same kitchen. It occurred among soldiers

From Bitlis Military Hospital, Bitlis, Turkey. Dr. Alptekin is now at Bird S. Coler Hospital, Welfare Island, New York.

who had served in the army for from 3 to 21 months, as well as among those who had been in service for only 20 days. The number of cases was greater in companies housed in close quarters.

The rapid increase in the number of cases and the fact that clinical and laboratory findings were similar in all cases made it evident that this disease represented an epidemic. The Corps Surgeon and, later, the Surgeon General were notified of the outbreak, and two teams of bacteriologists* were sent to Bitlis to investigate. They agreed that it was an outbreak of a contagious disease, the final report of the second commission being as follows: "Although there is a probability of a non-virulent primary atypical pneumonia which involves the pleura, it is recommended that sera be sent to the U. S. A. for further laboratory studies."

The patients were isolated, and the crowded conditions in the barracks were eliminated. This procedure appeared to have a significant effect in decreasing the number of new cases. The peak months were March, April, May, and June. The incidence was minimal throughout the summer, but increased somewhat in the fall and early winter (fig. 1). No new cases were seen after December 1955. As a result of the epidemic, the morbidity of pleurisy at Bitlis Garrison for 1955 was increased to 284 per thousand (table 1).

PROCEDURES

The patients were admitted to this hospital from units in which the criteria for hospitalization were, in general, having an axillary temperature over 99.5°F or being at least moderately symptomatic. All patients were kept under close clinical observation, and pleural fluid was withdrawn by thoracentesis. Smears made from every specimen were stained and studied carefully. Some of them also were examined by J. G. Scadding, M. D., Institute of Diseases of the Chest, London, England, and Ph. Schwartz, M. D., Warren State Hospital, Warren, Pa.

In 300 cases the following laboratory studies were performed: leukocyte count and differential, erythrocyte sedimentation rate, and examination of sputum for acid-fast bacilli. The Mantoux test was done on 120 patients, and control studies were performed on 200 subjects who were transient from outlying military posts and were normal, healthy soldiers. Blood serum from 55 patients was sent to Refik Saydam's Hygiene Institute, Ankara, for serologic testing to rule out Q fever and influenza. Roentgenographic examinations were made on only 30 patients because of a shortage

*Team 1: Colonel Tevfik Soyguder, M. D., and Captain Kemal Gurkan, M. D. (March, 1955); Team 2: Colonel Sevket Togar, M. D., Lt. Colonel Fethi Serter, M. D., and Captain Ilhan Kavunoglu, M. D. (April, 1955).

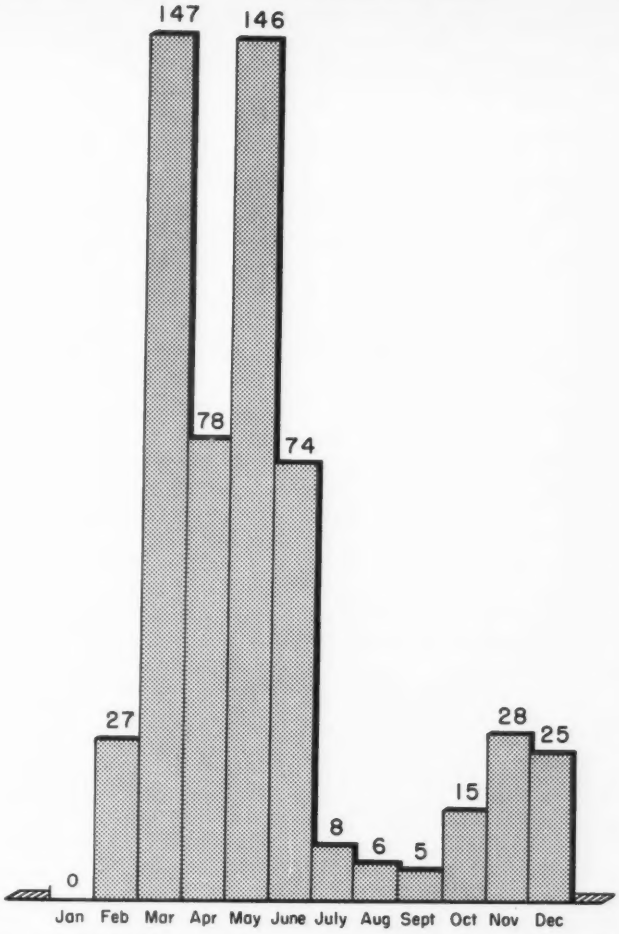

Figure 1. Monthly admissions of epidemic pleurisy cases to Bitlis Military Hospital in 1955.

of x-ray films, but fluoroscopy was carried out in an additional 150 cases.

Inasmuch as it was not possible to determine the cause of this disease through the usual laboratory and serologic procedures, tests were made on guinea pigs and rabbits. Both nasal and peritoneal routes were chosen for inoculation of most of the animals. Histopathologic examination of the animals was performed at the Pathology Laboratory of Gulhane Military Medical Academy, Ankara, Turkey; the Pathology Institute of the Uni-

TABLE 1. *Pleurisy cases and morbidity rate at Bitlis Hospital in 1953, 1954, and 1955. The garrison strength was constant at about 2,000 men throughout this period*

Year	Number of cases	Type of pleurisy	Morbidity per thousand
1953	40	Classic	20
1954	44	Classic	22
1955	8	Classic	284
	559	Epidemic	

versity of Istanbul, Istanbul, Turkey; and the Institute of Diseases of the Chest, University of London, London, England.

CLINICAL FEATURES

The clinical and laboratory findings were similar in all cases. The onset of the disease was usually abrupt, and most of the patients were able to state exactly when they had become ill. Initial symptoms were cough, malaise, chilliness and fever, anorexia, headache, and shortness of breath. There was sweating from time to time. The disease began with fever. The temperature ranged from 99.5° to 102°F during the first four to five days, then returned to normal.

Patients complained of a nonproductive cough. Pain in the lumbar and thoracic regions of the back followed within a few days after onset of the initial symptoms. Usually at the end of the first week of the disease it was possible to determine by thoracentesis that there was some pleural effusion. Malaise was marked, and patients complained of extreme fatigue, weakness, and exhaustion that caused them to be practically incapacitated.

At the onset of the disease, slight facial and scleral injection were noticed, and in typical cases tachypnea was obvious. It was quite possible to pick out these patients from a group of soldiers sent for examination, just by looking at them.

Although there was a nonproductive cough and hoarseness, sputum was scanty. However, 40 per cent of the patients reported blood-tinged sputum on two or three occasions during the first 10 days of their disease.

Physical Findings

There was pharyngeal injection. Dullness usually appeared at the base of the lungs approximately a week after the onset of the disease. This dullness usually could be elicited as high as a little above the angle of the scapula. There were many moist and dry rales, especially in the basal regions of the lungs;

however, no pleural friction rub was heard. None of the patients had pharyngitis, conjuctivitis, lesions of herpangina, or adenopathy. There was no relationship between the back pain and deep inspiration. Some serofibrinous, light gray-green fluid was aspirated by thoracentesis from the area of dullness in all 559 patients. We preferred the ninth intercostal space for the thoracentesis, because the chance of being able to obtain fluid was less at a higher space. Fluid was obtained from both sides in 111 cases, from the right side only in 212, and from the left side only in 236. The maximum amount of fluid aspirated from any patient was 15 ml.

The percentage frequency of occurrence of various symptoms and signs is shown in table 2.

TABLE 2. *Symptoms and signs in 559 cases of epidemic pleurisy*

Symptom or sign	Per cent
Cough	99
Malaise	90
Fever (within first 5 days)	75
Chilliness	75
Facial and scleral injection	60
Hoarseness	35
Abdominal pain	40
Anorexia	50
Headache	35
Blood-tinged sputum	40
Low or high back pain	98
Rales in basal area of lungs	95
Pleural effusion	100

Roentgenologic Findings

An enlarged hilar shadow was visible in 30 per cent of the patients. Although some pleural fluid was withdrawn from all patients, a small fluid shadow was observed at the costophrenic angle in only 5 per cent. It is known that as much as 300 to 400 ml of pleural effusion may not produce a shadow in a roentgenogram. In all patients the lung fields were normal (table 3).

LABORATORY FINDINGS

The results of laboratory studies made on the patients are summarized in table 4.

Pleural Fluid

The properties of the specimens of pleural fluid that were obtained are shown in table 5. After leaving these specimens

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TABLE 3. *Results of radiologic examination of chest in 180 patients*

Radiologic finding	Number of cases	Per cent
Enlarged hilar shadow	54	30
Small fluid shadow at costophrenic angle	9	5
Clear lung fields	180	100

TABLE 4. *Summary of results of laboratory studies on patients with epidemic pleurisy*

Procedure	Result	Number of cases	Per cent
Erythrocyte sedimentation rate (Westergren)	20-80 mm/hr	210	70
	13-20 mm/hr	90	30
Leukocyte count	Normal	195	65
	Below normal	105	35
Differential	Lymphomonocytosis	180	60
	Normal	120	40
Acid-fast bacilli in sputum	Negative	300	100
Mantoux test			
On 120 patients	Negative	58	48
	Positive	62	52
On 200 controls	Negative	92	46
	Positive	108	54
Complement-fixation test for Q fever	Negative	14	
	Positive 1/16	1	
	Positive 1/32	1	
Hemagglutination-inhibition test for influenza			
Infl. A	Negative	39	
Infl. A(L)	Negative	39	
Infl. B	Negative	36	
	Positive 1/160	1	
	Positive 1/320	2	

in tubes for 12 to 24 hours, a fibrous substance developed (fig. 2). From 50 to 1,096 nucleated cells per μl of fluid were counted; 60 to 70 per cent of these cells were monocytes, according to Drs. Schwartz and Scadding. The remainder of the cells were lymphocytes and endothelial cells. A few erythrocytes were noted.

TABLE 5. *Typical properties of pleural fluid specimens withdrawn by thoracentesis from 559 patients.*

Amount	10 to 15 ml
Color	Light gray-green
Rivalta reaction	Positive
Appearance	Serofibrinous; did not coagulate. After leaving in a tube for 12-24 hours, a fibrous substance looking like a spider web developed.
Nucleated cells per μl	50 to 1,096
Differential of these cells	Monocytes, 60 to 70 per cent; Lymphocytes and endothelial cells, 30 per cent.
Bacteria or acid-fast bacilli in smears	Negative

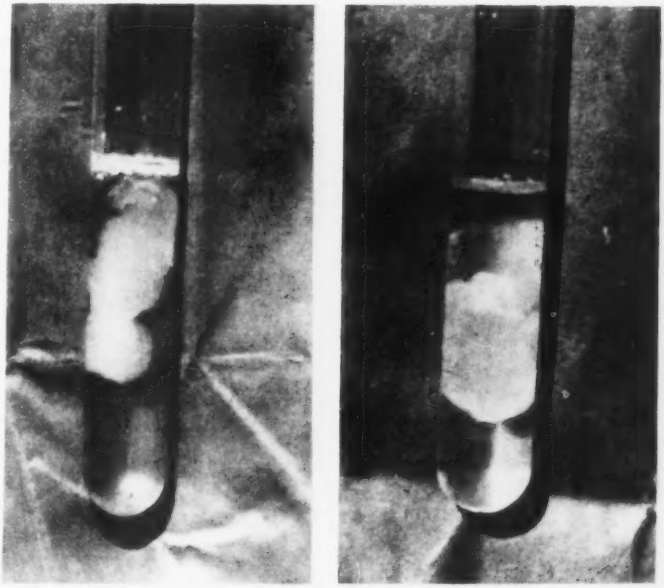

Figure 2. Two samples of fluid withdrawn by thoracentesis from patients with epidemic pleurisy, after standing for 24 hours. Note fibrous substance.

A part of a report from Dr. Lynne Reid, Institute of Diseases of the Chest, Brompton, London, on the smears made from pleural fluid is as follows: "...This pleural reaction being predominantly Lympho-Monocytic suggests either a lower grade chronic infection or an acute response to a virus infection. The clinical features of an acute illness make this last possibility the more probable."

Animal Experiments

A summary of the animal experiments is shown in table 6. All of the animals died within 11 to 80 days after the inoculations, and none had fever over 102°F.

Histopathologic reports of these animals did not indicate definitely that the disease was of virus origin; they did, however, establish that it was not tuberculous. The following histopathologic report from Dr. Reid concerns tests 7, 8, 9, and 10: "The tissue from 4 guinea-pigs has been sectioned. The liver and kidneys appear to be within normal limits. In the lungs there are occasional foci of haemorrhage and also diffuse peribronchiolar cellular infiltration. This contains few polymorphs and consists mainly of leucocytes and macrophages. This material gives no real indication of the nature of the original disease, but it does at least seem to exclude the possibility of it being a tuberculous infection."

TABLE 6. *Results of experiments with rabbits and guinea pigs*

Test Number	Test Animal	Route of infection		Infectious material		Results and autopsy findings
		Peritoneally	Nasally	Pleural fluid (ml)	Patient's nose washing (ml)	
1	Rabbit	+	+	2	2	Died 19 days after inoculation; pneumonia
2	Rabbit	+	+	2	-	Died 11 days after inoculation; pneumonia
3	Rabbit	-	+	2	-	Died 28 days after inoculation; pneumonia
4	Rabbit	+	+	2	-	Died 41 days after inoculation; no abnormal finding
5	Guinea pig	+	+	2	1	Died 20 days after inoculation; pneumonia
6	Guinea pig	+	-	2	-	Died 63 days after inoculation; pneumonia
7	Guinea pig	+	+	2	-	Died 62 days after inoculation; pneumonia
8	Guinea pig	+	+	2	1	Died 35 days after inoculation; pneumonia, empyema, splenomegaly
9	Guinea pig	+	-	2	-	Died 69 days after inoculation; pneumonia
10	Guinea pig	+	+	2	1	Died 80 days after inoculation; pneumonia

COURSE OF THE DISEASE

Illness lasted from 1 to 3 months. In 60 per cent of the cases, the rales in the lungs disappeared in 10 to 15 days; in the remainder, rales persisted for 3 or 4 weeks. The facial, scleral,

and pharyngeal injection and hoarseness disappeared within 10 to 15 days; however, cough persisted in most cases. The erythrocyte sedimentation rate returned to normal in 10 to 15 days.

The resorption of the pleural effusion ran a prolonged course; in many cases 3 to 5 thoracenteses were performed at intervals of 15 to 20 days for control of the fluid. Low and high back pain, chilliness, and weakness lasted for a long time. Weight loss was noticeable during the first month of illness.

Convalescence was considerably affected by cold weather, and there was exacerbation of symptoms upon resuming even light work. Some patients again showed the same symptoms and signs 4 to 8 months after their first illness; but we could not say definitely whether these represented reinfection or flare-up of the original disease.

Prolonged convalescence was a prominent feature of this epidemic. Most of the patients were unable to work for 3 to 4 months.

Prognosis was benign, and no deaths occurred. It was not possible to use a systematic medical treatment, but good results were obtained from symptomatic treatment.

REPORT OF A TYPICAL CASE

A 21-year-old soldier from an infantry regiment, was admitted to this hospital on 20 March 1955 with chief complaints of cough, chilliness, marked malaise, thoracic back pain, and anorexia. The patient had been well until two days prior to admission, when he noticed the onset of chilliness, feverishness, malaise, and anorexia, together with profound weakness and excess coughing.

On the morning of admission the patient noticed a small fleck of blood in his sputum. He had thoracic back pain but no sharp chest pain. His back pain was continuous and did not vary in intensity or severity. He had tachypnea, and facial and scleral injection that made it easy to pick him out from among the soldiers who were sent to the clinic. On admission, his temperature was 100.5°F; pulse, 92, and respiration rate, 26 per minute. There was pharyngeal injection without any exudate and hoarseness; coryza was not present. Slight dullness was noted at the right base, and there were abundant moist and dry rales at the base and lower part of the lungs. Adenopathy was absent, and the remainder of the physical examination was normal.

On admission the patient's sedimentation rate was 56 mm at the end of the first hour. The white blood cell count was 7,600 per μl, with a differential of 51 per cent segmented cells, 34 per cent lymphocytes, 14 per cent monocytes, and 1 per cent eosinophils. The reaction to the Mantoux test was positive. The sputum was negative for acid-fast bacilli. A roentgenogram of the chest showed a prominent hilar shadow but clear lung fields.

Four days after admission 10 ml of light gray-green colored, serofibrinous, Rivalta-positive* pleural fluid was aspirated by thoracentesis from right base. In this pleural fluid specimen 876 nucleated cells per μl were counted, of which 63 per cent were monocytes, 25 per cent were large lymphocytes, and 12 per cent were epithelial cells. Neither bacteria nor acid-fast bacilli could be found in a smear.

After 24 days of hospitalization the patient was discharged to 3 months' leave.

DISCUSSION

Pleurisy is encountered frequently in military hospitals. Its cause, especially in places where adequate laboratory facilities are not available, is often assumed to be tuberculosis, and management of the case is based on this assumption. Although tuberculosis is known to be the cause of pleurisy in perhaps 80 to 90 per cent of the cases, there are numerous other diseases in which pleurisy may be seen. However, I have not been able to find any mention in the literature of an epidemic of viral or infectious disease in which pleural effusion was a prominent sign in all cases, as was true in the Bitlis series.

Differential Diagnosis

Tuberculous pleurisy. In all of our cases, the fever was of only short duration (4 to 5 days) at the onset of the illness, but tuberculosis can produce various patterns of fever. The amount of pleural effusion was small in every case, whereas in tuberculous pleurisy the fluid may rise to the upper border of the scapula. The quality of the fluid was in every case different from that typical of tuberculous pleurisy. It did not coagulate on standing in a tube for 24 hours, contained mainly monocytes rather than lymphocytes or neutrophils, and had very few erythrocytes. Pleural fluid injected into guinea pigs and rabbits produced no evidence of tuberculosis. There was no increase in the rate of positive reaction to tuberculin, as compared with 200 normal controls.

Epidemic pleurodynia. The clinical picture in all cases was quite unlike that of epidemic pleurodynia, with its abrupt onset of severe paroxysmal pain in the region of the attachments of the diaphragm, aggravated by movement and respiration.[2-4] In epidemic pleurodynia there may be fibrinous pleurisy or the "benign dry pleurisy" described by Scadding,[5] but not pleural effusion. All reported outbreaks of epidemic pleurodynia have occurred in summer and early autumn, whereas the height of the epidemic in Bitlis was during very cold weather in March, with minimal incidence in the summer months.

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*Reaction indicating exudative nature of the fluid.—*Editor*

Q fever and primary atypical pneumonia. Both diseases are characterized by evidence of pulmonary infiltration, whereas the lungs were clear in all of the 180 patients examined radiologically. Serologic tests for Q fever were negative.

Influenza. Hemagglutination-inhibition tests for influenza were negative, and none of the patients had coryza.

Undifferentiated acute respiratory disease, and pharyngoconjunctival fever. In neither the undifferentiated disease described by the Commission on Acute Respiratory Diseases,[6] nor in the pharyngoconjunctival fever described by Bell and associates,[7] is there the characteristic pleural effusion seen in all of our cases. On the other hand none of the patients in the Bitlis epidemic had conjunctivitis, pharyngitis, or adenopathy.

SUMMARY

An epidemic of an acute, febrile illness, characterized by basal pleurisy with effusion and following a benign course, was observed at the Bitlis Military Hospital, Turkey, in 1955. All of the 559 cases differed from other reported types of pleurisy and other kinds of acute respiratory disease, in the common occurrence of basal pleurisy with effusion and in various special features of the pleural fluid, including a predominance of monocytes among the cellular elements. Convalescence was prolonged; few patients were able to return to work sooner than 3 to 4 months after onset of their illness. Incidence was greatest in late winter, spring, and fall; was minimal in summer. Spread was most rapid in crowded quarters, apparently being mediated by air-borne droplets. It seems most probable that this disease, tentatively designated "epidemic pleurisy," is caused by a virus.

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SYSTEMIC VERSUS LOCAL FACTORS IN CORONARY ARTERY OCCLUSION

RUSSELL L. HOLMAN, *M. D.*
WILLIAM F. ENOS, Jr., *M. D.*
JAMES C. BEYER, *Captain, MC, USA*
WILLIAM C. MANION, *M. D.*

HOW can an atheromatous plaque exist for years and decades, then undergo changes that may result in fatal disease, sometimes causing death within a matter of minutes? The almost universal prevalence of atheroma is attested by recent investigations which have confirmed and extended previous studies showing that every person beyond the age of three years has atheroma of some degree in the aorta,[1] and that by the end of the second decade over three fourths of all individuals have some atheroma in the coronary arteries.[2]

In the succeeding decade or two, pearly plaques become the rule in both the aorta and coronary arteries. Yet, decades may go by before complications ensue, and in about half of the population no known disease referable to atherosclerosis manifests itself during the life span. What then precipitates disease? Is it a metabolic tide of systemic origin or a purely local circulatory disturbance such as vasoconstriction? We reasoned that if it were the former, we should find similar changes around pearly plaques in other parts of the body, whereas if it were the latter, such changes would be absent.

MATERIALS AND METHODS

A preliminary survey of histologic sections of aorta and coronary arteries in 75 unselected cases of recent myocardial infarction (age range, 21 to 81 years) contributed to the Armed Forces Institute of Pathology disclosed sections of both the aorta and the coronary arteries in only 18 cases. In 7 of the 18, evidence of "activity" consistent with a metabolic tide could be found both in the aorta and in the coronary arteries. By "activity" is meant the presence of foam cells that appeared to be of recent vintage as indicated by their separate and distinct cellular outlines and their grouping in clusters and streaks beneath

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the endothelium. We reasoned that these could be interpreted as the active phase of the lipogranulomatous process that goes by the name atherosclerosis, just as collections of plump epithelioid cells represent the active phase of the granulomatous process of tuberculosis. These preliminary results prompted further studies as follows:

The anatomic material from two additional groups of cases at the Armed Forces Institute of Pathology was reviewed: (1) 106 of the 120 cases of coronary artery occlusion in the 18 to 29 year age group previously reported by Yater;[3] and (2) 49 cases of inanition obtained from the Dachau prison camp in Germany, which were selected for comparison because of the current interest in dietary factors in the pathogenesis of atheroma. The review of this material was supplemented by planned studies of two other groups of cases: (1) Sections selected from one or more atheromatous plaques in or near the aortic ring or in the ascending limb of the arch of the aorta were compared with sections from similar plaques in one or more of the coronary arteries in 30 asymptomatic cases in a comparable age group reported by Enos, Beyer and Holmes.[4] (2) Multiple histologic sections from the fatal atheromatous plaque in a coronary artery were compared with multiple sections of atheromatous plaques in the aorta, in 5 selected cases of acute coronary artery occlusion.

None of the material could be considered ideal, but some of the missing links were minimized in the forward-looking research as exemplified by the last two groups studied. For example, in the first 3 groups of cases (75 of myocardial infarction, 106 of coronary artery occlusion, and 49 of inanition) sections of the aorta were missing more often than not. Those that were present were presumed to be "routine" sections which were selected without a definite purpose in mind. Fat stains and formalin-fixed tissues for frozen sections rarely were available. Hence, most of these surveys had to depend upon a study of routine sections stained with hematoxylin and eosin. In the planned studies (the last 2 groups), the histologic material included routine stains for fat (oil red O) and other special stains in selected cases.

OBSERVATIONS

The results of the studies on the five groups of cases are summarized in table 1, and representative pathologic changes are illustrated in figures 1 through 4. "Positive data" consistent with the concept of a metabolic tide are recent foam cell collections in lesions of both aorta and coronary arteries, the latter presumed to have been taken at or near the site of maximum occlusion.

Preliminary Cases of Recent Myocardial Infarction. This group, as already mentioned, showed evidence consistent with a metabolic tide in 7 of 18 cases.

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TABLE 1. *Number of cases with satisfactory sections of both aorta and coronary arteries that showed evidence of activity consistent with a metabolic tide*

Groups surveyed	Age range	Cases studied	Cases showing aorta and coronary arteries	Cases "positive" for metabolic tide	
	Years	Number	Number	Number	Per cent
Coronary artery occlusion					
Preliminary cases	21-81	75	18	7	39
Reported by Yater	18-29	106	41	19	46
Selected cases	26-44	5*	5	3	60
Asymptomatic					
Dachau inanition cases	17-65	49	4	–	–
American soldiers	18-29	20	20	2	10
Japanese coroner cases	14-45	10**	10	1	10

* Included 1 woman
** Included 3 women

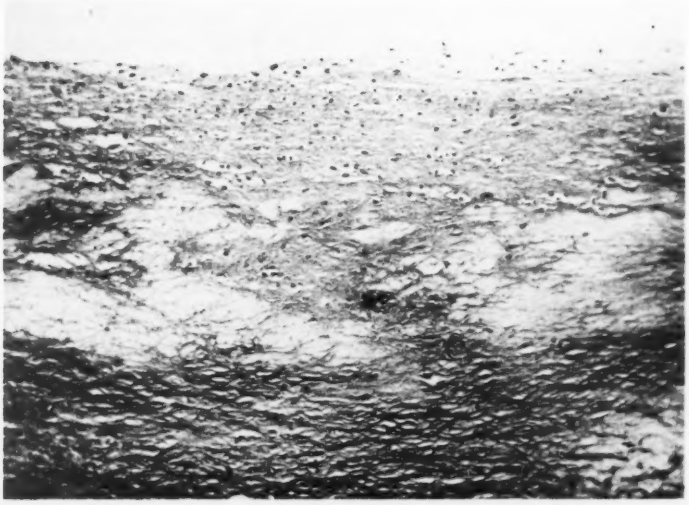

Figure 1. Coronary artery from obese white man 31 years of age who collapsed soon after awakening in the morning. Foam cells and edema beneath the endothelial lining and separating layers of media; scattered leukocytes in both locations. (Hematoxylin and eosin stain, × 100)

Cases of Coronary Artery Occlusion Reported by Yater.[3] Only 106 of the 120 cases of coronary artery occlusion in individuals under 30 years of age could be located at the time of this survey, and "satisfactory" histologic sections were available in

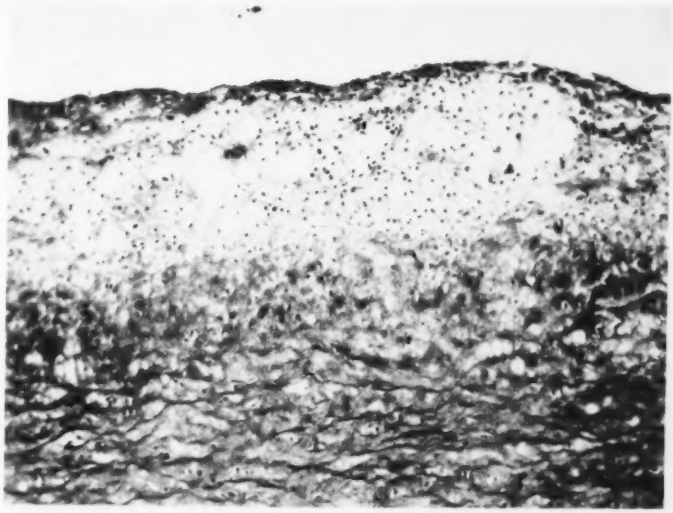

Figure 2. Aorta from same case as figure 1. Masses of lipid including conglomerate forms of foam cells beneath the endothelial lining. (Hematoxylin and eosin stain, × 100)

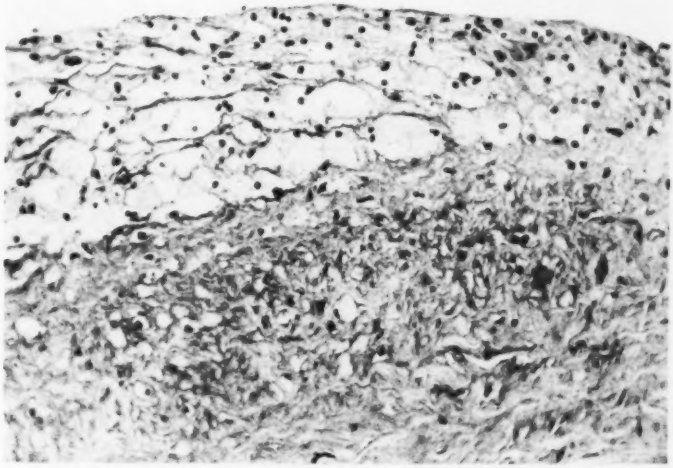

Figure 3. Coronary artery from 30-year-old white man whose symptoms appeared less than one hour before death. Recent collections of foam cells in hyalinized intima of the coronary artery. (Hematoxylin and eosin stain, × 200)

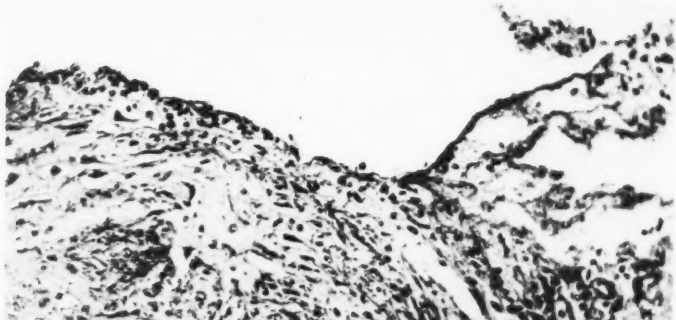

Figure 4. Aorta, same case as figure 3. Recent atheromatous deposit (conglomerate foam cells) beneath inner lining and some leukocytic reaction. (Hematoxylin and eosin stain, × 200)

only 41 of these cases. Recent collections of foam cells were seen in both aorta and coronary arteries in 19 (46 per cent) of the 41 cases. In 5 there was evidence of old thrombosis; in 5, of recent thrombosis; and in 9, of old and recent thrombosis. Extravasations of red blood cells and the presence or absence of phagocytosed hemosiderin could be correlated closely (18 of 19 cases) with the estimated age of the thrombosis. Old hyalinization of connective tissue about old lipid material, *i. e.*, evidence for pearly plaque formation, was present in all 19 cases. Occlusion of the lumen varied from 50 per cent to complete, with 90 per cent or more of the lumen blocked in 16 of the 19 cases. All three of the major coronary arteries were involved, with the most frequent site of partial or complete occlusion in the anterior descending branch of the left coronary artery.

In 9 additional cases the findings were equivocal, *i. e.*, definite collections of foam cells in the aorta but with equivocal collections of foam cells in the coronary artery or *vice versa*, or equivocal collections of foam cells in both locations. These 9 cases were not included in the 19 cases with "positive data." The clinical symptoms, especially manner of onset and duration of symptoms, did not differ significantly in cases with and cases without "positive data."

Selected Cases of Acute Occlusion of Coronary Arteries. An average of 52 sections of the coronary arteries and 5 sections of

the aorta per case were studied in this small group of cases. As can be seen from table 1, the incidence of "positive" cases was high, but the number of cases is too small to warrant comment. The histories of the 3 "positive" cases in this group of 5 were carefully reviewed for any lead that might point to a metabolic tide. Two of the patients were men 30 and 31 years of age respectively, in whom the first attack was fatal; both were dead on arrival at the hospital. The onset of symptoms in both men was in the morning—one died in bed and the other in the bathroom—and the symptoms in each case lasted less than one hour. One was obese; the other was not. Both gross anatomic protocols recorded small bright yellow nodules in the adrenal cortex. The third "positive case" was that of a white woman 26 years of age with hyperlipemia (1300 mg/100 ml) and hypercholesterolemia (575 mg/100 ml)—possibly familial—who had had a previous heart attack one year before the fatal episode. This case should be considered separately, leaving 2 of 4 cases "positive," with acute onset during rest or relative inactivity in young men the only possible indication of a metabolic tide.

Dachau Inanition Cases. Only 4 aortas were found among the histologic sections obtained from 49 prisoners of Polish, French, German, and Yugoslav extraction. Clinical histories were practically nonexistent. The principal cause of death was infection in almost all cases. No instances of coronary occlusion or myocardial infarction were noted. Body weight, which was recorded in 38 of the 49 cases, ranged from 70 to 135 pounds and was 100 pounds or less in 31. The striking feature of all the sections from the arterial tree was the total absence of foam cells. Practically all of the sections of heart showed extreme serous atrophy of subepicardial fat. The extremely thin intimal layer of the coronary arteries in these sections was in striking contrast with the thicker intimal layer in sections of the coronary artery from other groups. A few old hyaline plaques were noted in sections from both the aorta and coronary arteries, but again the total absence of foam cells was the feature of note.

Asymptomatic or Control Cases. These came from 2 sources:

1. American soldiers killed in action in Korea; 20 cases of men 19 to 29 years of age, with 2 showing recent collections of foam cells in aortic and coronary artery plaques. These cases were from the group previously reported by Enos, Holmes and Beyer.[2]

2. Japanese cases obtained from the coroner's office in Tokyo and from the Department of Pathology at the Kyushu Imperial University Medical Faculty: 10 persons 14 to 45 years of age, 1 of whom had small recent collections of foam cells in plaques in both sites. Three females, 14, 16, and 20 years of age, all "negative," are included in the group of 10. The one "positive"

case was that of a Japanese man, 35 years of age. These 10 cases were taken at random from the group recently reported by Enos, Beyer, and Holmes.[4]

DISCUSSION

Collections of foam cells have long been recognized as a distinguishing feature of atheroma. Hence the findings reported in this article of the presence of recent collections of foam cells in atheromatous plaques in both the aorta and the coronary arteries are not new in any sense of the word. Any merit that the findings may possess is dependent upon mechanisms and timing.

To discuss mechanisms first, it is obvious that the size of the atheromatous plaque can be increased and the size of the lumen correspondingly reduced by any of the following mechanisms: (1) increased filtration or inbibition of fluid or lipid, (2) increased local synthesis of lipid,[5-7] (3) decreased outflow of fluid or lipid, and (4) any combination of the three.

These are the probable mechanisms of accretion,[8] and this in itself is sometimes all that is found to account for a sudden or unexpected death. It also is possible that any of these mechanisms might put a relatively sudden strain on endothelial-lined channels and their basement membranes to cause rupture, extravasation, and sometimes thrombosis. Thus, accretion *per se* could account for ulceration, hemorrhage, and thrombosis. Furthermore the activity of certain chemical processes or even the mere presence of certain lipid substances might so alter surface tensions as to produce the vascular complications. Thus there are mechanisms of a systemic nature that could produce the same consequences as local vasoconstriction in or about the margins of an atheromatous plaque.

The finding of similar recent collections of foam cells in both aortic and coronary artery plaques with a frequency of about 45 per cent in those whose death was attributed to coronary artery occlusion, and with a frequency of 10 per cent or less in those whose death was attributed to other causes, lends some support to, but does not substantiate, the concept of a metabolic tide. That such collections of foam cells were not found in the other 55 per cent of cases with death attributed to coronary artery occlusion does not exclude their presence. Nor does it necessarily mean that local circulatory disturbances alone were responsible for the ulceration, hemorrhage, and thrombosis, for it is well known that certain individuals—even certain families and especially certain races—are more disposed to the early development of coronary artery occlusion. These individual, familial, and racial implications, however, are based on statistical analyses and do not come to grips with fundamental mechanisms. In general, they are more consistent with the concept

of metabolic tides than they are with the concept of local hemodynamic factors.

Also in support of metabolic tides are two additional fragments of evidence obtained in this study: (1) qualitative differences in the Japanese component of the control or asymptomatic cases, and (2) quantitative differences in the Dachau cases. In the Japanese cases, lipid was less conspicuous and less concentrated, stained a deeper red (had less of an orange tint) with oil red O reagent, and was more finely dispersed and more often extracellular than in the American cases. These differences have been noted previously[4] and probably reflect differences in dietary habits as well as racial peculiarities. The sections from the Dachau cases were noteworthy for their almost complete lack of foam cells. So striking was this feature as to raise a provocative question as to whether or not foam cells can be formed during inanition.

Possibly the best evidence for metabolic tides is the impression gained from review of the sections of aortas and coronary arteries from young adult males that lesions in the two locations are usually in the same phase or stage. If the aortic lesions were composed principally of altered ground substance, so, too, were the lesions of the coronary arteries. If the aortic lesions contained clusters of foam cells or basal grumous material, so, too, did the lesions of the coronary arteries. If two "crops" of lesions or evidences of accretion were found in one location, they usually were found in the other. Certainly, it was possible to encounter and describe differences, but it was easier to find similarities.

If obscurity shrouds some of the mechanisms involved in atherogenesis, it is even more difficult to describe and interpret the timing of the sequence of events presumed to have been an integral part of the life history of the lesions we have reviewed. For example, it is not known whether the process of atherogenesis in man is continuous or discontinuous, but the scant evidence available favors episodic accretion. This evidence is derived from the frequent finding—especially in the aorta—of "crops" of apparently recent lesions mingled with and superimposed upon obviously older lesions. This evidence has been substantiated in rabbits that have been fed cholesterol discontinuously over varying periods.[9]

The time required for the foam cells to appear and to form aggregations in man is not known, but in animals the process is usually described in terms of weeks. The earliest foam cells are said to appear within days, hence it is unlikely that the events of the preceding 24 hours would have an immediate influence on the collections of foam cells that we have emphasized in the human cases. The available data point to intermittent or

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episodic metabolic tides with a periodicity punctuated by weeks, rather than to ripples or waves punctuated by hours or days.

Originally it was hoped that some confirmatory clinical evidence might be gathered during study of the human cases with recent foam cell collections in both aorta and coronary arteries, but the recorded observations were incomplete on many significant points and the only positive suggestion was the rapid onset of symptoms and fatal outcome in young males while at rest or shortly after arising from bed. It is possible that a careful study of nonfatal cases might yield clues, and that alerted clinical suspicion coupled with selected chemical determinations at critical times might yield useful data reflecting the metabolic tides suggested by the anatomic data presented in this paper.

SUMMARY

An attempt has been made to assess the role of systemic versus local factors in the production of coronary artery occlusion by studying sections of aortas and coronary arteries in three groups of cases and two groups of controls at the Armed Forces Institute of Pathology. Some evidence was obtained to support the concept of a metabolic tide in nearly one half of the cases with coronary occlusion.

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EVALUATION OF AMNESIA IN BRIG MEDICAL PRACTICE

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"WE WERE in Japan. One night there was trouble and it became a fight. I vaguely remember getting hit on the head. When I came to, I was in Philadelphia and it was months later." This was the explanation offered by a young Marine who was awaiting court-martial for being several months absent without leave (AWOL).

Amnesia is a frequent complaint among servicemen confined in the brig for AWOL. It presents a diagnostic problem, because among the many amnesic antisocial personalities and malingerers, there is always the solitary and unusual case of dissociative reaction with amnesia and fugue (running away). Like a neurotic with a back pain, any inmate who complains that he lost his memory is entitled to a comprehensive medical and psychiatric examination.

Aside from the responsibilities of the medical officer that are inherent in his profession, there are legal aspects to be considered. It is a travesty of the public trust to drop the charges—most often AWOL—in the case of the antisocial personality claiming amnesia. This would suggest that he is the victim of a disease process which absolves him of legal responsibility and might necessitate his discharge from military duty—a situation that would result in financial loss in the form of the cost of his training and equipment and the cost of his subsequent pension.

On the other end of the scale, it would be unjust to imprison a man who has lost control of himself and his identity for a period of a few days because of overwhelming anxiety related to his presence in military service. In such a case, the individual is unaware of the nature or consequences of the act, although later he is able to participate in his own defense.

Thanks to television and numerous novels such as Hilton's *Random Harvest,* amnesia again has become a popular symptom. The relative decline of cases between the first and second world wars was ascribed to a growing public sophistication. Perhaps

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this trend is being reversed through the efforts of modern unsophisticated entertainment such as TV and comic books. In any case, one finds amnesia a frequent complaint among antisocial personalities. True fugues are more unusual. Principally because of the problem of disposition, it is essential for the medical officer to make a differential diagnosis when the inmate first arrives at the brig.

The main point of differences between an antisocial personality and a case of fugue based on dissociative reaction—both men claiming amnesia—lies in the mechanism behind the major symptom. For the antisocial personality, the relating of an amnesic episode is the result of an attitude of impulsive opportunism with the prospect of secondary gain (his release). The individual is consciously aware that he did not truly lose his identity. For the dissociative reaction (psychoneurotic), the episode was the consequence of overwhelming stress on the psychobiological organism.

Since one cannot reach a defensive mechanism of the ego directly, the diagnosis must be established by differential means. Naturally, a good longitudinal history would help to establish the diagnosis. The antisocial personality often has a paucity of deep outside interests and a long history of rebelliousness, impulsiveness, difficulties in school and with the law. There is an over-all and consistent pattern to his social relations that is quite in contrast with the dissociative-reaction type. A discussion of these differences is not pertinent to the problem of making an immediate differential diagnosis in a man who claims amnesia as the basis of having been AWOL. Unless at the time of examination a longitudinal social service history is available, a differential diagnosis must be made on clinical grounds alone. These two psychiatric entities will be compared, using the format of the mental status evaluation.

ATTITUDE AND GENERAL BEHAVIOR

Antisocial personalities are generally possessed of better than average dramatic abilities. Their appearance in the examining room can vary from wild-eyed excitement to profound depression. The medical officer must use all his art to disarm the patient of his defenses. An innocuous and nonpersonal discussion of the conditions in the brig, a cigarette offered to the inmate, or mention of the furnishings of the office might be the first step.

Both antisocial personalities and dissociative-reaction types are alert to the interviewer, but the antisocial personality has a peculiar piercing attentiveness in which he actively and consciously sizes up the interviewer, gauging his caliber and estimating his weaknesses. As the interview progresses, the antisocial personality will assume control and direction of the talk,

avoiding some things, stressing others. The interviewer feels that he is in the presence of a subtle super-salesman. This is in contrast to the dissociative-reaction type, who is passive to the interview, permits himself to be directed in the discussion, and is aware of the doctor but does not adapt himself quickly to what he thinks is the type of person interviewing him. This social faculty of adaptation and of manipulation of people seems to be notable in antisocial personalities and probably is the basis of their manifest charm.

As the antisocial personality is put at ease, one notices a variety of facial expressions intended to be appropriate to the circumstances but not seeming to be genuine. It may seem to the doctor that the patient is trying to appear distraught and "intense." The anxious patient either appears dazed in expression or smiles a great deal because of obvious apprehensive restlessness.

In such an interview, where one is trying to assay the underlying character structure of an inmate who claims amnesia, it always is helpful to gently steer the conversation to sex. The antisocial personality, if not suspicious of the doctor's motives, is likely sooner or later to begin to boast of his social successes with women. Such persons have little hesitancy about discussing sex, and if the doctor simulates a modicum of naivete he will encourage the patient to reveal a fairly fundamental diagnostic point. Aside from boasting and lack of hesitancy, the antisocial personality may well describe a pattern of sexual behavior that is impulsive, varied, and poorly integrated. Homosexual episodes, seductions, relations with prostitutes, all are revealed without remorse, shame, or any affect of noticeable intensity. In contrast, patients of the dissociative reaction grouping are rarely boastful about their sexuality or even moderately successful in their efforts at seduction. Because of an exaggerated concern for appearances and a basic shyness, the anxious psychoneurotic type will avoid a discussion of sexuality. Even when involved with the topic he is inclined to be evasive and embarrassed.

A similar diversion can be made to discuss policemen and the law. The antisocial personality, if not suspiciously evasive, can be drawn into a discussion in which he will reveal strong feelings of contempt, disdainful amusement, or deep hostility for the forces of law and order. He might take the initiative to enlighten the seemingly "square" doctor with a few personal experiences in which he came to grips with the minions of the law. As would be expected from the dynamic differences between these two character types, the individual with dissociative reaction avoids all contact with the law because of his basic apprehensiveness and because he feels the need to conform to social structure. If anything, he envies the police and secretly wishes that he could be as heroic in his behavior.

Sooner or later, the doctor will have to discuss the nature of the charges against the inmate. If the doctor is sufficiently "folksy" and unthreatening in demeanor, the antisocial personality often will begin spontaneously to express his feelings about "unjust charges," "being pushed around," and "unfair" superiors. He might go on at great length and the doctor will note how poor his judgment is in a situation where he is personally involved. He might distort the facts to such a degree that the medical officer will conclude that he has a basic defect in reality testing. A later examination of the service record might reveal that the patient was lying flagrantly. He rarely can accept punishment as due him because of his behavior.

In contrast to this, the amnesic inmate who is of the dissociative-reaction pattern will often assume responsibility for having been AWOL and will speak of his feeling that punishment is to be expected. He generally does not express a deep core of irrational resentment toward his confinement and possible future punishment, as is the case with the antisocial personality. This often brings out the moral blunting of the antisocial personality who is unable to mold his behavior in terms of the concept of "right and wrong," and also seems to develop a highly personalized code of behavior. In interview such a patient might even be unable to discuss intelligently the importance of justice, the meaning of right and wrong, or why people should mold themselves to a concept of social behavior. Here the individual of the dissociative-reaction pattern can be seen to have a rather deep sense of moral (or socially correct) behavior and a sense of law and order. It is this aspect of his personality that literally forces him to lose his identity in order to resolve an overwhelmingly stressful situation which his ego is unable to resolve.

Probably one of the most obvious points of difference between these two clinical entities lies in the language faculty. Antisocial personalities tend to be glib, often give the impression of extensive vocabularies, and are facile liars. In contrast, the dissociative-reaction type, because of his strong feelings of anxiety, is often blocked in his speech, stutters, and fumbles with words. He often has trouble explaining himself.

Another point of difference to be noted in attitude and general behavior is in their respective deportments while imprisoned. The personnel assigned to brig duty are always cooperative in describing the inmates' behavior. One finds that antisocial personalities often are inclined toward arrogance, flippancy, smirking, and subtle provocations. They are "wise guys" and frequently do not appear to be bothered by their loss of freedom. They quickly fall into the pattern of hostility toward the "police" on duty in the brig and eagerly adopt the jargon and deportment one finds among prisoners in almost any type of institution. In contrast to this, the victim of the amnesic fugue is reported to

be shy, very quiet, and seems inoffensive to the guards. He probably is noted to avoid the louder inmates and to be careful about staying out of trouble. Although he can become angry about what he feels is an act of injustice, he is inclined toward compliance to regulations—even in the prison. A careful documentation of the amnesic's behavior while awaiting trial can be an important foundation to a diagnosis which will, in all probability, be questioned at court-martial proceedings. In the eyes of the judges specific examples of behavior lend greater validity to a diagnosis than does medical opinion.

A further point of differential diagnosis on the behavioral level lies in the countertransference. This cannot be used in court testimony, but is important in the practice of medical art. The medical officer often feels, in talking to antisocial personalities, that he is being cleverly manipulated. The doctor generally does not feel a surge of empathy toward the patient, but rather an inner sense of emptiness as he gropes, in interview, for the psychologic essence of the patient. The patient's explanations in response to pointed questions seem plausible enough, until the doctor stops to ask himself, "Would I have done it that way?" He begins to believe that the patient's actions are based on impulse rather than on overwhelming anxiety or on reason. This lack of empathy and difficulty in understanding the thought and action of the antisocial personality is in contrast to what he generally feels toward the dissociative-reaction type of person. Here he finds himself feeling somewhat sorry for the inmate's predicament and finds himself trying to reassure and relax his patient. The doctor interjects words, supplies phrases, and perhaps becomes a little patronizing. The physician might decide that he could experience the same reactions in response to the same stressful situations, although he cannot imagine himself being so overwhelmed as to lose his identity and all awareness of his behavior. The countertransference is not a point of "scientific evaluation," but, because it enters heavily into every diagnosis anyway, it might well be utilized as an additional point of clinical differential diagnosis.

MECHANISMS OF THOUGHT

Inasmuch as both types of disorder are basically nonpsychotic, a disturbance of thought is not easily elicited. Persistent questioning and conversation with the antisocial personality might reveal a repetition of circumstances such as difficulty with authority, where the individual seems to fail to profit from his experiences. Eliminating compulsive behavior based on delusions or hallucinations (as one might see in schizophrenia), one discovers that the individual is compliant to impulses and fails to profit from the consequences of his behavior. In contrast to this, the dissociative-reaction type is rarely impulsive and tends to be markedly affected by his experience, as revealed by the pattern of his life in the past.

The differences between these two clinical types are not easily elicited, but, as mentioned before, the antisocial personality thinks and acts quickly, adjusts himself to a provocative question with a spontaneous prevarication—something seen much less often in dissociative-reaction types. The antisocial personality is almost always an unreflective type of individual who asks himself few questions. This defect can be elicited when he is asked for the reasons behind his behavior. His answers seem to be created on the spur of the moment and not to be the result of deliberation under more quiet circumstances. The dissociative-reaction type is more thoughtful, but rarely to the degree of the obsessive-compulsive character. He can explain his behavior, with the exception of the amnesic episode. One also senses in interview the marked indecisiveness of the dissociative-reaction type. A further difference in types of thinking might be discovered by questioning the patient regarding reasons for past indiscretions. Antisocial personalities are more inclined to be righteous in the sense of believing that they acted correctly while the dissociative-reaction individual feels it is he who is out of step with the world, admitting to grave errors in judgment in the past.

EMOTIONAL RESPONSE

If a report of the inmate's behavior in the brig is available, the demonstration of a bad temper is suggestive of an antisocial personality. The most significant difference in the area of affect between these two types lies in the basic lack of warmth of the antisocial personality. One believes that these patients imitate and express the manifestations of emotion but harbor a deep and unremitting emptiness beneath. If the medical officer is reluctant to utilize the countertransference as a point of clinical diagnosis, a review of the patient's history as related by the inmate may reveal a paucity of deep interpersonal relationships—he just doesn't get involved with people. In contrast, the dissociative-reaction type struggles to conceal his lively affects, using the defense of the blank facies, and might admit that he is "too emotional." He might cry if under stress or become quite depressed during his confinement.

Antisocial personalities generally show greater psychomotor activity in the brig and almost never are withdrawn, except during interview when they are feigning emotional illness. Any attempted suicide is likely to have more serious intent in the dissociative-reaction type than in the antisocial personality, who impulsively will wrap things around his neck, swallow buttons, or go on a hunger strike. A minor point might be explored in reference to animals and pets. Dissociative-reaction types are more inclined toward compassion, sympathy, and attachment to animals, often to the point of being very hostile to anyone who abuses them. Anti-

social personalities do not have this degree of emotional warmth and are casual or indifferent about animals, their sufferings, et cetera.

Antisocial personalities rarely show any seriousness of purpose in their behavior. They develop no skills, strive for no professions, and never apply themselves. The more socially oriented dissociative-reaction types are more "outwardly directed" and try to mold themselves to the social concept of skills, self-support, and responsibility. They are also more inclined to have some over-all plan for their lives and toward which they are striving. This aspect of life is dealt with superficially and opportunistically by the antisocial personality.

CONTENT OF THOUGHT

Differences between these two types are not striking in this area. One finds the antisocial personality more prone to place the responsibility for his circumstances on others, as mentioned above. He has little interest in moral or ethical problems and cares little for abstract discussion. He is also inclined to exaggerated notions as to his charm, abilities, et cetera, particularly in reference to women.

The antisocial personality is more likely to feign "hearing voices" and "having visions"—often a complaint too easily believed by psychiatrists who fail to look for accompanying anxiety or the effect of hallucinations on behavior.

SENSORIUM, INSIGHT AND JUDGMENT

Whereas the dissociative-reaction type might show poor judgment because he is intellectually dull, the antisocial personality frequently demonstrates a defect in judgment based on his semantic aphasia and disorder of thought. He never quite grasps what important emotional experiences mean to others, and because of this, does not have the capacity for empathy. He is more inclined to rationalize his behavior *post factum,* and seems to have a very shallow image of himself, rarely going beyond the level of self-aggrandizement. Seldom does he express any sincere concern for what he is. This is in contrast to the dissociative-reaction type who is chronically more dissatisfied with himself. Antisocial personalities rarely show efforts for change or self-improvement in their life-pattern.

SUMMARY

Amnesia is a common complaint among servicemen confined in the brig and charged with offenses such as absent without leave. Cases of amnesia with organic causes rarely are seen in the brig because they are hospitalized elsewhere. It is important to establish whether or not the complaint is a genuine one. This often is determined by the underlying character struc-

ture. In individuals where anxiety is strong, there may be a true dissociative reaction with fugue. Such overwhelming tension would be an extenuating factor in considering responsibility for the infraction of regulations. On the other hand, the complaint of amnesia in an antisocial personality often is a fabrication and has nothing to do with the reasons for the offense in question. Medical opinion as to whether the individual was "aware of the nature of the act when he committed it" must be based on the character structure of the man in question. Such a differentiation between a true amnesia with fugue and the simulated one seen in antisocial personalities can be on a clinical basis. Careful evaluation and documentation in the health record is important when the medical officer is called upon to give medical testimony at court-martial proceedings. An error in diagnosis will result in a miscarriage of justice in the case of the amnesic dissociative reaction with fugue, or in financial remuneration of the conscious violator of service regulations in the case of the antisocial personality.

THE PHYSICIAN'S ASSISTANT

"Every physician ought to remember that parents, and especially mothers, are the ones who repeatedly take care of the suffering of their children during their minor illnesses and injuries and that they continue this nursing function even through adolescence. They turn to physicians for their professional services only when the nature or severity of an illness or injury is too serious for them to manage. If hospitalization is not necessary or not possible, the physician must depend upon the child's mother to function as his nurse. His influence, like the influence of immediate relatives in other situations, is of great importance in the medical treatment of the sick child. Her confidence and trust in the physician increase his therapeutic intent, and, in transmitting her positive feelings about him to his patient, she strengthens her child's faith in the physician. The same favorable influence on the physician may be observed when the significant relative of an adult patient admires and respects him. If, however, the mother of a sick child, or the immediate relative of an adult patient mistrust, depreciate and dislike the physician, they thereby diminish his personal influence with his patient and the effectiveness of his treatment."

—LEO H. BARTEMEIER, M. D.
in *Maryland State Medical Journal*
p. 430, Aug. 1957

TREPONEMA PALLIDUM IMMOBILIZATION TEST IN THE FAR EAST

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THE *Treponema pallidum* immobilization (TPI) test was initiated as a diagnostic service at this laboratory in January 1955. This was the first use of the test on a routine basis anywhere in the Far East. The TPI test is a specific serologic test for syphilis and other treponemal diseases, based on the immobilization or killing of living, motile treponemata mediated by treponemal antibody in conjunction with complement, whereas the basis of the Wassermann test and its many modifications (serologic tests for syphilis, or STS) is not clear, and positive results in these tests may be unrelated to treponemal infections. This is not unexpected inasmuch as the STS are based on the reaction of substances in test serum, usually designated as Wassermann reagin, with phospholipid constituents of normal tissue.

From a technical point of view, the only serious difficulty encountered in establishing the test in Japan was the requirement for a mixture of nitrogen and carbon dioxide gas. Those obtained from Japanese sources were toxic to treponemata, making it necessary to import gas mixtures from the United States.

The test procedure at this laboratory was established by Dr. Ruth A. Boak of the University of California at Los Angeles, and performed as outlined by Peterson, Asch, and Boak.[1] The reproducibility of the test procedure, as determined by the quantitative testing of a reference serum on different days, exceeded that reported in several publications. One such serum, tested 15 different times, gave a mean titer of 36.9 with a standard deviation of 13.8.

The value of and indications for the TPI test have been discussed in the literature.[2,3] Perhaps the greatest value of the

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test is its unique role in distinguishing between latent syphilis and nonspecific ("biological false positive") reactions in the STS.

In this area of the Far East, we also have been impressed by the value of the test in indicating syphilitic infection despite strong evidence for a biological false positive reaction in the standard STS. In one case, a patient at Tokyo Army Hospital with infectious mononucleosis gave weak (1+) reactions in both the standard cardiolipin microflocculation and complement-fixation tests (the STS tests of the U. S. Army and the U. S. Air Force). In view of the low level of reactivity of this patient's serum, the absence of clinical signs and history of treponemal infection, and the fact that patients with infectious mononucleosis may give reactions in the STS,[4] it seemed probable that we were dealing with biological false positive reactions. Yet the serum of this patient after recovery from infectious mononucleosis was found repeatedly to be reactive in the TPI test. On further investigation, a history of syphilis was uncovered.

COMPARISON OF STANDARD AND TPI TESTS

Nearly all the specimens submitted to this laboratory for the TPI test also were subjected to the cardiolipin complement-fixation test of the U. S. Army and the Air Force. A comparison of the results obtained during 1955 is given in table 1.

TABLE 1. *Comparison of results obtained by the quantitative cardiolipin complement-fixation (CCF) test and the qualitative TPI test on a random sample of 446 Orientals and Americans*

TPI finding	Cardiolipin complement-fixation titer															
	Total		Negative		Less than 1 (±)		Less than 1 (+)		1		2		4		8		Over 16	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Negative	216	48.4	150	33.6	20	4.5	8	1.8	12	2.7	5	1.1	14	3.1	6	1.4	1	0.2
Weak	33	7.4	19	4.3	6	1.4	2	0.5	1	0.2	1	0.2	2	0.4	1	0.2	1	0.2
Positive	197	44.2	33	7.4	16	3.6	8	1.8	32	7.2	23	5.2	25	5.6	21	4.7	39	8.7
Total	446	100.0	202	45.3	42	9.5	18	4.1	45	10.1	29	6.5	41	9.1	28	6.3	41	9.1

Before the TPI test was introduced, a dictum existed to the effect that the higher the titer obtained in the STS, the greater its diagnostic significance. The results in table 1 generally bear out the truth of this dictum, but also indicate notable exceptions, such as might occur with the sera of patients with collagen disease. For example, there were 21 specimens with a titer of 4 or greater in the complement-fixation test and no reaction in the TPI test. It is rather unlikely that those specimens all represented cases of early syphilis in which Wassermann reagin was present in the serum before the immobilizing antibody appeared. More likely, most of them represented reactions elicited by conditions other than treponemal infections. In addition, 33 specimens gave a reaction in the TPI test despite

their giving none in the cardiolipin complement-fixation test. These 33 specimens reacted to some degree, however, in the cardiolipin microflocculation test, which is adjusted to a higher level of sensitivity than the cardiolipin complement-fixation test.

It should be emphasized that the correlation of the results between the Wassermann tests and tests for treponemal immobilization antibody is a function of the sample tested. Specimens were submitted from all U. S. Armed Forces medical installations in the Far East Command, so that the sample was essentially random and undefined except for a TPI test requirement. In it, individuals of all types were represented: military personnel, U. S. Civil Service personnel, American and Japanese dependents of U. S. military personnel, a few Koreans, and hospital patients. Samples exclusively from hospital patients, from venereal disease treatment centers, or from specific geographic areas of the world might result in correlation of an entirely different type.

RESULTS IN ORIENTALS

Prior to the introduction of the TPI test, our data had shown that a significantly greater percentage of routine specimens from Orientals than from Americans reacted in the STS. These results indicated either a greater reservoir of syphilis or a greater incidence of biological false positives among the Orientals. The TPI test provided evidence that the former interpretation was the correct one. In the American sample, 56 per cent of 191 specimens, all from different individuals, that reacted in the cardiolipin microflocculation test also reacted in the TPI test. In the Oriental sample, 63 per cent of 232 specimens that reacted in the cardiolipin microflocculation test also reacted in the TPI test, and 77 per cent of 120 specimens that reacted in the complement-fixation test also reacted in the TPI test. These differences between the Oriental and American samples were not significant at the 5 per cent level by the chi-square test.

The Oriental sample consisted almost exclusively of specimens from Japanese dependents of military personnel and Japanese employees of the U. S. Armed Forces, and, as suggested by several Japanese investigators, the high reaction rate in both the standard STS and TPI test may not reflect the situation in the Japanese nation. Be that as it may, we are not aware of any reason why the percentage of biological false positive reactions in the STS should differ appreciably in our sample from what would be found in testing other persons in Japan. The STS reaction rate in any Japanese population, therefore, probably should provide a true index of the incidence of syphilitic infection.

Various studies have indicated a particularly high prevalence of biological false positive reactions among certain racial groups such as the North American Indian, the Negro, the laboring class in Mexico, and the Guatemalan Indians.[5] These observations probably are valid, although the studies were performed without benefit of the TPI test. The results obtained at this laboratory, however, do not indicate that the Orientals tested had a particular predilection for biological false positives, at least as compared to the Americans tested.

SUMMARY

Although the *Treponema pallidum* immobilization (TPI) test is highly complex and requires well-trained technicians for its performance, it has been established successfully in the Far East, and there is a steadily increasing demand for its use. Valuable in the detection of biological false positive reactions, it has, in many instances, indicated the existence of a present or past syphilitic infection in individuals whose reactivity in the standard tests might otherwise have been disregarded. The TPI test also has indicated the probable validity of the standard tests as an index of syphilitic infection in the Orient.

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KLEPTOMANIA

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KLEPTOMANIA is a condition characterized by repeated episodes of stealing that are considered to be nonpredatory and are the result of strong unconscious forces compelling the individual to commit the offenses. Psychiatrists and other medical officers in the military service are frequently called upon to examine an individual caught stealing, and to determine whether or not the offense represents a case of common theft or a case of theft involving unconscious motivation. The differentiation between the predatory thief and the kleptomaniac, although not always important in a medical sense, is nevertheless an important issue because of its legal implications. The *Manual for Courts-Martial* states:

> ... A person is not mentally responsible in a criminal sense for an offense unless he was, at the time, so far free from mental defect, disease, or derangement as to be able concerning the particular act charged both to distinguish right from wrong and to adhere to the right.[1]

Whether or not the individual was moved to steal because of an irresistible impulse and therefore could not adhere to the right is usually the most important legal consideration facing the psychiatrist in evaluating persons accused of theft. Karpman[2] stated that kleptomania must be viewed as a symptom of a neurosis and therefore it is senseless to punish the individual displaying this symptom. In some cases, he pointed out, it is the expression of an overt psychosis. The underlying unconscious motives causing the condition called kleptomania can be brought to light by psychiatric examination. The following are case histories of patients exhibiting kleptomania.

CASE REPORTS

Case 1. A 21-year-old unmarried U. S. Marine Corps corporal was caught stealing money from the trousers of other marines in his barracks. When apprehended, he ran wildly through the barracks, leaped from a window, attempted to bury the money in the ground, and then returned to his bed pulling the bedcover over his head. He was taken into custody and awarded a Special Court-Martial. While in the brig he appeared emotion-

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ally disturbed, and a psychiatric consultation was requested. When first examined, he appeared in panic. He cried uncontrollably and demonstrated marked blocking and confusion associated with an inability to recall clearly recent events. Admission to the hospital was advised. Only after several weeks of hospitalization was a significant reduction in his anxiety achieved.

Past history revealed that the patient had stolen frequently since attending the eighth grade of school. He had been punished physically on several occasions when thefts were discovered by his parents, but this only served to increase his need to steal. Usually the patient stole money, but at no time did he break into a building, plan his thefts beforehand, or join others with the intent to steal. He always possessed sufficient spending money and usually disposed of the stolen money by throwing it away or buying gifts for his parents. The theft was always an implusive act and usually very obvious. It was under situations of stress, such as starting school or punishment by his parents, that he was most likely to steal. His parents were unaffectionate and overly punitive. The patient's father was a rigid and compulsive individual who insisted on strict obedience to his demands. The mother expressed affection only by giving him small sums of money. She frequently referred to him as that "damn kid." She would often misplace her purse and then accuse the patient of stealing it, stating, "Once a thief always a thief." It is noteworthy that each of the patient's three older siblings had been involved in considerable antisocial behavior.

This patient suffered from marked feelings of isolation, rejection, and held a deep seated hostility toward his parents.On mental status examination he appeared to be a schizoid personality type who had a great need for affection. This need, along with dependency needs, was opposed by feelings of hostility, guilt, and rejection, rendering him unable to make lasting or mature relationships with people. Under sufficient stress, he experienced anxiety of panic proportions associated with confusion, withdrawal, and inaccessibility. At those times he would steal, and the anxiety would be lessened. During the latter half of his hospitalization, the patient was permitted to go on liberty and he only occasionally experienced an easily controllable desire to steal. After five months of psychotherapy he was honorably discharged from the U. S. Marine Corps.

Case 2. An 18-year-old married Navy airman was seen opening a sealed mailbag and removing a package. The event occurred at night aboard ship, and appeared to have been done without any consideration as to who might be watching. He was followed and was found sitting in a room with the partly opened package in his lap. When apprehended, he seemed to regain contact with the environment suddenly and claimed no recollection of how he came to possess the stolen package. A General Court-Martial was ordered, but, in view of the unusual behavior associated with the theft, a psychiatric consultation was obtained. As a result of the consultation, doubt was cast upon the patient's mental competency at the time of the act and the patient was hospitalized.

Past history disclosed that this individual had been regularly stealing since the age of 13, at which time he discovered a baseball glove secreted in his sweater after he walked out of a sporting goods store. Many instances of theft followed, but at no time could he actually recall the act of gaining possession of the stolen article. Several times he removed money from his father's pocket and was beaten by the father. After enlistment, he continued to steal money and served 51 days in the brig when he confessed to one of his crimes. Following completion of the tenth grade in school he married, and at the time of hospitalization had a child one year of age. He was reared in an inimical family setting where there were frequent open clashes between the parents. The patient's father was described as a miserly man who hoarded his money and deprived his wife and children of many basic needs. At times, however, he would foolishly spend money for his own entertainment. According to the patient, his father was extremely critical of the infidelity of others, but he himself frequently would be openly flirtatious with women. In addition to physically abusing the family, he imposed many restrictions which led to minor conspiracies between the mother and son in their attempt to outwit him. For example, the patient and his mother would secretly smoke cigarettes together and exchange gifts. The patient's wife was never accepted by his mother, who expressed her resentment by avoiding her. She also continued giving her son gifts for his own personal use while ignoring his wife.

The patient suffered from severe anxiety attacks and on occasion experienced dissociative-like episodes not accompanied by stealing. Generally, he exercised suppression and withdrawal to handle his problems and hesitated to believe the reality of the situation. He was hospitalized for three months, part of the time on an open ward, and at no time did he commit a theft. It was believed that this patient was a latent schizophrenic and was not responsible for his actions at the time of the offense. The charges against him were dropped and he was awarded an honorable discharge from the Navy.

Case 3. A 21-year-old unmarried Navy seaman was transferred to the hospital after he confessed to the theft of numerous articles belonging to his shipmates. A search of his locker revealed many stolen small items such as cigarette lighters, fountain pens, and clothing. No disciplinary action was brought against him, and upon recommendation by the psychiatrist he was hospitalized.

This patient began to steal when he was 10 years old and continued to do so frequently except for one period during his last year of high school. In every instance of theft, the patient was unable to recall the act of stealing the acquired item, but only later would find the article in his possession and then realized that it had been stolen. Frequently he would remain in the company of another person in the effort to avoid stealing, but when alone he exercised no control over his actions. Often the patient returned or paid for the stolen merchandise, but in the months prior to hospitalization, especially while in the Navy, he was unable to do that for fear of punishment. Fountain pens and "flashy" cigarette

lighters were the most frequently stolen articles. He was caught on only two occasions and was able to "lie his way out." While in the Navy, he was considered to be a chronic liar and was generally disliked by his shipmates.

This patient was an only child and was reared in an economically comfortable home. He described his mother as a "grouchy" woman who screamed and yelled a good deal. For many years she complained of arthritis and blamed the patient for her illness because she had once fallen while bringing him lunch. Early memories of his mother reflected his hostility toward her. He recalled that she would destroy his favorite toys as means of punishment and she would state, "You broke something of mine so I will break something of yours." At other times she would tantalize him with a toy and say that it had been for him, but because he hadn't been good she would withhold it and give it to another child. The patient stated that he was never close to his mother and that he deliberately aggravated or provoked her anger. He said that she "hid behind her arthritis." There was reason to believe that the mother openly encouraged or sanctioned antisocial behavior, especially stealing, by her son, as hostile action against her husband. The father was described as a passive, shy, man who worked as a government financial investigator for many years. The patient's father stressed honesty and frequently related tales about people in the government who had stolen but were caught through his investigations. At the age of 15, the patient ran away from home and spent several weeks in a detention home. He enjoyed reckless activities and engaged in frequent heterosexual acts which were apparently an expression of hostility toward women. Prior to enlistment he had many hobbies and his room was always filled with hundreds of articles such as magazines, model ships, and baseball bats.

Examination of mental status revealed this patient to be of better than average intelligence. He was a fluent speaker who thought he could talk his way out of any situation. When confronted by an anxiety-provoking situation, he would usually withdraw or escape from it. There was evident emotional flattening, and he faced life situations with a detached and distant attitude. Throughout his hospitalization, he remained in a locked ward and greatly resisted any effort to be placed on an open ward. While on the locked ward, he felt no anxiety and did not steal. In therapy he was very resistant to any insight and was considered to represent a latent schizophrenic reaction. After two months of hospitalization he was honorably discharged as unsuitable for military service.

Case 4. An unmarried Navy seaman was referred for psychiatric consultation after he admitted to the theft of money from the wallets of two men in his outfit. He further stated that he had stolen considerable sums of money and clothing throughout his enlistment. He was awarded a Special Court-Martial and I was requested to examine him and testify at his court-martial. On the basis of psychiatric opinion he was then hospitalized.

This individual began stealing shortly before enlistment when he removed hubcaps from an automobile. After enlistment he frequently stole items of clothing that usually did not fit and were not useful to him. Following the death of his father one year prior to hospitalization, the patient began to steal money, ostensibly because his family was then short of funds. In almost every instance, the theft occurred after he had been in bed about 30 minutes and was in the twilight stage of sleep. He would then get out of bed, walk through the barracks or compartments and rummage through the personal effects of others until he could find money. On one occasion he took a wallet out of the hand of a sleeping sailor, but he usually removed the money from trousers hung over the bunks. Following the theft, he would return to bed and on awakening in the morning realized the possession of stolen money, but could not recall from whom or where the money was stolen.

The patient is the oldest of three children. As a child he did his best to provoke and aggravate his father and as a result was constantly in trouble. He would then make up a lie that his mother "always believed," and she in turn would then protect him from a spanking by his father. As a child he often felt lonely and unwanted in spite of the fact that he was given an excess of material things by his parents. Although the family was well off financially, his parents would remind him of the sacrifice made each time a gift was presented. The patient's father was a highly respected individual who participated in many community functions and constantly preached against dishonesty. The patient's mother was chronically ill and controlled the family by fluctuations in her symptoms.

Psychiatric examination found this individual to be an alert and intelligent person whose greatest strength was in his glibness and his ability to outtalk his opponents. He had great dependency needs, suffered from extreme loneliness, and when alone or without activity to occupy his thoughts became very tense. The patient was hospitalized two months and responded well to therapy. He achieved considerable insight and control over his impulse to steal. Following psychotherapy the charges against him were dropped and he was honorably separated from the Navy.

Each of the four patients with kleptomania whose case histories have been presented had a perfectionistic parent who exercised rigid control and demanded honesty and social compliance from the child. The other parent was permissive, or even openly sanctioned the child's antisocial behavior as a hostile act against the spouse. In each case the father was the scrupuously honest parent who was embarrassed by the child's stealing. The mother encouraged stealing by such action as repeatedly calling the child a thief, protecting him from punishment after he had stolen, accepting stolen goods as gifts, and even evincing pleasure when the child had committed a theft.

The causes of antisocial behavior were extensively studied by Johnson and Szurek.[3] They clearly demonstrated that repeated

stealing, as well as other forms of unlawful and socially unacceptable behavior, is generated by unconscious and occasionally conscious antisocial impulses in the parents. They further pointed out that parents of the nongang-member, delinquent child derive unconscious gratification from the child's antisocial activities. Parental fostering of antisocial behavior is believed to be a basis of the stealing pattern exhibited by each of the four patients presented. Karpman[4] referred to Stekel's thesis which described the sexual implications frequently observed in this condition where an individual experiences an orgasm following a theft. The presence of emotions such as excitement or tension and release suggest a sexual gratification derived from the act of stealing.

Kleptomania is considered to be a symptom of a neurosis or psychosis. These patients display numerous manifestations of emotional disturbance such as severe anxiety attacks, dissociative reactions, depression, and occasionally an escape from reality. Where true kleptomania exists, it may be stated first, that the act is part of a repeated psychoneurotic pattern; second, that the accused exhibited mounting tension or anxiety which was relieved by the theft; and third, that the act generated by the illness was so strong that the deed would have been committed even though detection was likely at the time of the offense. If these criteria are met, it is then agreed that the accused suffers from irresistible compulsion and was unable to adhere to the right. Karpman[2] further pointed out that punishment has no deterrent effect in these cases because it does not alter the psychologic mechanisms responsible for the offenders' antisocial performances.

SUMMARY

Kleptomania is a condition characterized by repeated episodes of nonpredatory stealing that are the result of strong unconscious forces compelling the individual to commit the offenses. Psychiatrists are frequently requested to decide whether or not an individual represents a case of kleptomania. Case histories of four persons suffering from this condition have been presented to illustrate the basic characteristics of the illness. In each case, unconscious sanctions on the part of the parents were instrumental in creating the need to steal. Psychiatric opinion holds that persons suffering from kleptomania are mentally ill and cannot be considered as criminally responsible for their crimes.

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FABRICATION OF A RESILIENT PLASTIC INTERDENTAL SPLINT

A Paint-on Technic

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TO PROTECT their teeth and jaws against injury during athletic events, boxers, some football players, and other athletes wear a standard rubber mouthpiece. Although this appliance affords some protection, it has serious shortcomings, namely: (1) poor retention with resultant ease of dislodgment; (2) impairment of breathing; (3) discomfort to the wearer because of unequal stresses on the teeth and excessive bulk; (4) increased muscular distress, and the possibility of damage to the temporomandibular articulation because of increased vertical dimension beyond tolerable limits for prolonged periods of time; and (5) the impossibility of talking, or of calling signals as a quarterback is required to do.

These shortcomings were eliminated in an improved interdental-splint mouthpiece developed at this School by Towle and Niiranen.[1] Made of a resilient vinyl resin, the improved appliance fits snugly against the teeth and soft tissues, and therefore is not easily dislodged. At the same time, the wearer can talk or call signals with but little, if any, impairment of speech. The increased vertical dimension is practically nil (about 3 mm at the incisors). Because the splint permits the pressure of normal occlusion, or force of a blow, to be distributed equally to all the teeth, its use greatly reduces the possibility of chipping or knocking out teeth. Finally, it may be worn for long periods of time with comfort.

In order to fabricate the interdental splint according to the technic originally described, it is necessary to use denture flasks. Nonprosthetic facilities find it difficult to obtain such flasks, however, and it is not possible to construct interdental splints

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in this way at all activities. The objective of this study, therefore, was to develop a practical method of fabricating the improved mouthpiece, that would not require a wax-up and the use of denture flasks. This article describes such a procedure.

METHODS AND MATERIALS

Alginate Impression. An alginate maxillary impression is made. A satisfactory impression must include tuberosities, frenum, and muscle attachments (fig. 1A), and should be free of bubbles. A plaster-water wash clears the impression of saliva and mucin, and an air blast is used to remove excess moisture. The cast (fig. 1B) is made with the hardest stone available, for example, Duroc or some similar product, since it must later withstand the sustained heat of curing, particularly if several splints are to be made on it. Use of a vacuum apparatus to prepare the stone mix is desirable if one is available.

Centric Relation Record. A square consisting of three thicknesses of ordinary baseplate wax is placed between the patient's teeth. The wax wafer should be large enough to provide a peripheral excess of several millimeters (fig. 1C). The patient is guided into, and instructed in, a centric relationship so that there will be about 2 mm of wax between the closest opposing cusps. Minimum cuspal indentations are required in the wax, to prevent a locking effect when the finished appliance is worn.

Articulator Mounting. The wax periphery is left untrimmed, and the tips of the mandibular cusps are reproduced by pouring a stone mix into the mandibular arch indentations in the wax wafer. This procedure provides a smooth surface around the cusps, which aids in obtaining a smoothly finished splint (fig. 1D). This stone cast is trimmed, as desired, prior to actual mounting.

Plain line, nonadjustable, "barn door hinge" type articulators are adequate, as the only movement required is a centric opening and closing. It is advisable to mount the maxillary cast on the lower arm of the articulator (fig. 1E), because the liquid vinyl resin that will be applied later flows quite readily. Otherwise, the mounting is done in the usual manner. Dense stone is used for the mounting as well as for the casts. The articulator should be stopped or locked to prevent accidental closure beyond the distance recorded by the wax wafer.

Fabrication. The mounted casts are dried completely in an oven below 100°C, the temperature required for steam. While the casts are still hot, a stiff-bristled brush is employed to coat them lightly, but thoroughly and smoothly, with a silicone releasing agent. This agent, or separating medium, may be one coating of

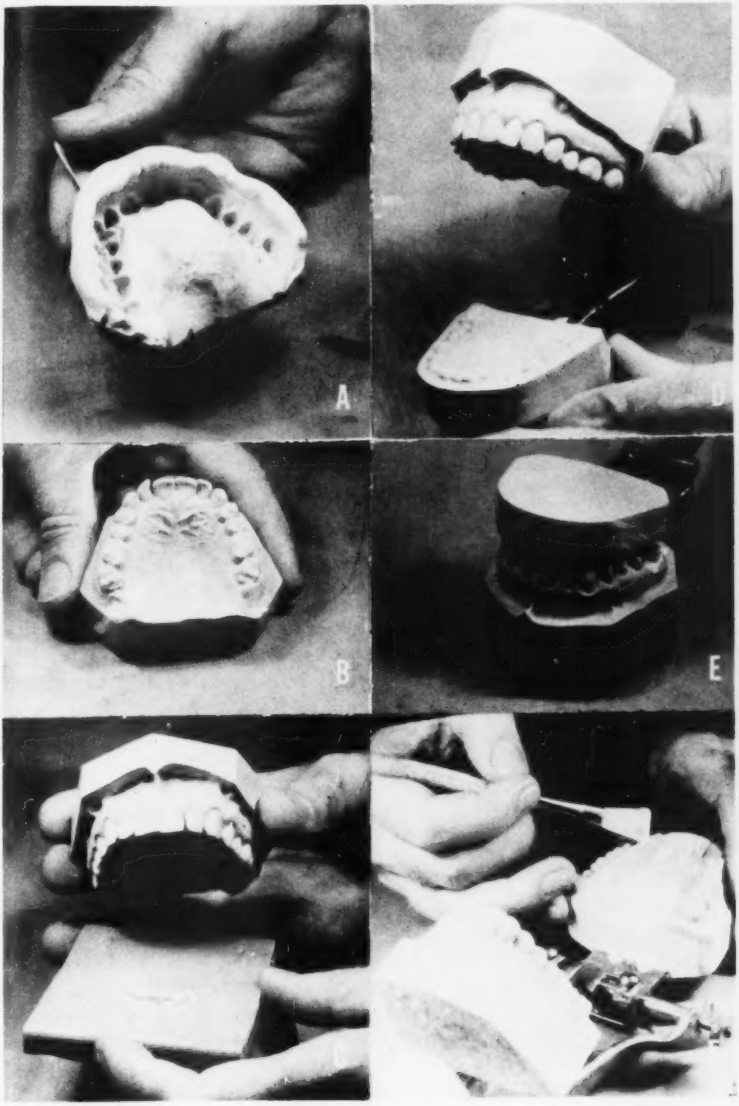

Figure 1.

Mucolube (silicone releasing agent) or three coatings of a silicone paste floor wax.

Camel's hair brushes of various sizes are used, as indicated, for different phases of the actual application of the vinyl resin. A thin layer of liquid vinyl resin is painted (fig. 1F) onto the surfaces of the maxillary cast that are to be covered, with the exception of the occlusal surface. To prevent flowing and puddling, thick layers should not be applied. In this respect, it is expedient to apply this and each succeeding layer by sections, rather than to attempt an entire surface at one time.

The cast with this applied section of a layer is then placed in the oven at 180°C (340°F) and is allowed to remain in the oven two to three minutes, or until the gloss begins to disappear from the resin. An alternate procedure is to flame the resin lightly (fig. 2A). Flaming, indeed, is the method of choice. The best flame for the purpose seems to be provided by a hand alcohol torch. However, other flames, such as from a Bunsen burner or a casting torch, may be used.

Experimentation for a few minutes is recommended before attempting to flame the actual case, because both the oven and the flame may result in premature curing (fig. 2B). If the individual layers are overcured, the finished splint will show a laminated effect; and overcuring will usually result in separation and peeling of the various layers where the lamination shows.

Successive layers of liquid resin are applied and partially cured in this manner until all but the occlusal surface (fig. 2C) is covered by the desired thickness of resin. The margins of the external and internal surfaces are extended occlusally to form the boxed-in effect of an occlusal trough (fig. 2D). The extent of these marginal rims must be determined by visual inspection and test closings of the articulator. At this time an extremely thin coating of liquid resin is carefully applied to the entire external and internal surfaces, and is then oven-heated or flamed to produce the final smooth surface.

Throughout the above procedure, each layer should be allowed to cool before proceeding; otherwise, the next layer will start to cure as it is applied, and premature curing will result in possible entrapment of air bubbles or a grainy, undesirable appearance. The occlusal trough is filled by simply pouring in liquid vinyl resin (fig. 2E). Then the articulator is closed to the predetermined position. The mandibular cast cusps are now in uncured resin, with the maxillary cast below (fig. 2F). The case is placed in an oven at 180°C for 15 to 20 minutes until the desired cure, indicated by the degree of "brownness" (fig. 3A), is attained. The oven should be large enough so that the case does not come into contact with or come close to the sides of the oven during curing.

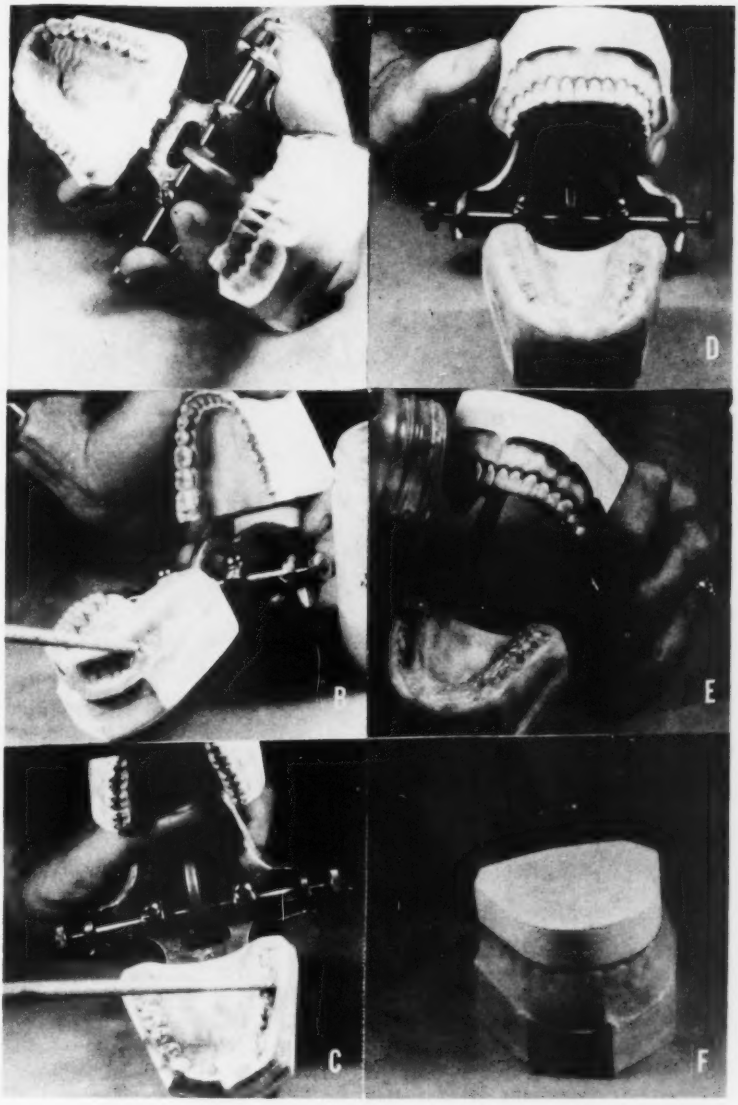

Figure 2.

Finish. After cooling, the cured splint is removed from the cast (fig. 3B), and the peripheral borders are trimmed with sharp scissors to the desired dimensions. The cut edges are smoothed

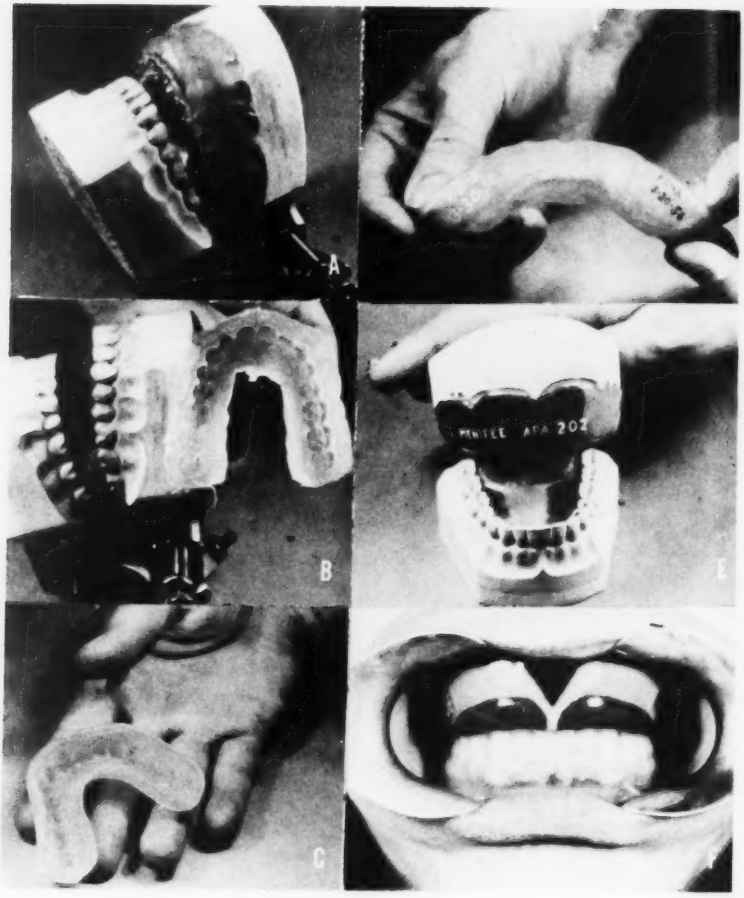

Figure 3.

and rounded by carefully applying, with a brush, liquid vinyl resin to adjacent sections, approximately an inch at a time (fig. 3C). Each of these sectional applications is successively flame-cured to the same color as the rest of the splint. If further curing is desirable, the splint is placed on several layers of gauze or on a piece of asbestos, and put in the oven for the required additional length of time.

Individualization of Splints. This can be achieved by any one of several methods:

(1) The lettering of name, date, activity, and so forth can be applied either with India ink or with various colored plastic inks on any smooth surface of the splint. This surface is then covered by a veneer of liquid vinyl resin and flamed lightly prior to the final oven cure (fig. 3D).

(2) Polyvinyl chloride resin is prepared commercially in several basic colors, and each of these can be blended or modified with pigments prepared by the manufacturers. Color may be applied by brush in any desired pattern and then veneered with an additional layer of the liquid vinyl resin.

(3) Lettering also may be applied to the flamed pigmented layer (fig. 3E) before application of the final veneer. In this way, date of splint fabrication can be noted for durability and wear records. The name of the person wearing the splint and his activity, ship, or team also can be incorporated. Team or individual colors can be utilized both for decorative purposes (fig. 3F) and as an aid in preventing dressing room mix-ups of mouthpieces.

DISCUSSION

Both the flask and paint-on technics for fabrication of resilient plastic, protective interdental splints appear to produce mouthpieces far superior to obtainable stock appliances. However, the need for flasks limits the number of activities capable of utilizing the flask technic. The paint-on technic, by eliminating wax-up and flasking procedures, should make it possible for all facilities to provide more persons with individually constructed splints.

While it is true that with the flask technic, the operator is free to carry out other tasks while stone is setting in the flask, no appreciable deleterious effect is likely to be noted in the finished appliance if the paint-on technic is interrupted from time to time for periods of one or more hours. Lettering and coloring, if desired, are applied successfully with the paint-on method. Several splints can be made from each cast to provide a person with spare appliances. As with the flask technics, a smoothly rounded peripheral border is obtainable with the paint-on technic.

It is believed that more research and experimentation would be advantageous and productive.

SUMMARY

The construction of resilient plastic, interdental splints can be accomplished with the paint-on technic—eliminating the

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need for a wax-up, obviating the use of denture flasks, and permitting the fabrication of such appliances at facilities lacking access to prosthetic equipment. The technic consists of painting liquid vinyl resin on a cast which has been lubricated with a silicone releasing agent as a separating medium. When the case has been built up as desired, it is cured in a dry heat oven for about 20 minutes at 180°C. Individualization of splints is achieved by applying pigments for coloring, or by lettering for record purposes and as a means of identification. Several splints can be constructed on each cast, providing the patient with spare appliances. Splints prepared with the paint-on technic appear to be as successful and as satisfactory as those produced with the flash technic, and both methods apparently produce splints that are far superior to available stock appliances.

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HEALTH: A FULL-TIME HOBBY

"It comes as no news to physicians that something has happened to the American public in the past 20 years. People know more about their bodies and 'the ills that flesh is heir to' than anyone would once have dreamed.

"This is not to suggest that they understand physiology or that they really care about the difference between a strain and a sprain, but they do hear in a flash of new advances in diagnosis and therapy.

"...One thing is certain, the mass communications media have proved the public's appetite for medical news and opinion to be insatiable.

"Government, too, has participated in the dissemination of medical news; and since the thirties, we have seen the tremendous development of public relations on the governmental level."

—HENRY S. McNEIL
in *Journal of South Carolina Medical Association*
p. 258, July 1957

ACUTE RHEUMATIC FEVER

Electrocardiographic Effects of Sodium Lactate and Potassium Chloride

CARL S. ALEXANDER, *Lieutenant, MC, USNR*

DISTURBANCES in rhythm and A-V conduction are commonly observed in acute rheumatic fever. Both rhythm and conduction can be influenced by change in position,[1-3] vagal blocking agents, Mecholyl Chloride (brand of methacholine chloride),[4-6] and drug-induced tachycardia.[3] Some believe that the impaired A-V conduction of acute rheumatic fever, which most often is manifested by prolongation of the P-R interval, is due to increased vagal tone.[7] As Grant[8] recently has pointed out, however, this explanation is doubtful because of the absence of other manifestations of vagotonia in rheumatic fever and the failure to induce P-R interval prolongation by guarded stimulation or by cholinergic drugs.

The ease with which impulse generation and conduction can be influenced in rheumatic fever, as well as other cardiac disturbances,[9-11] suggests that pH and electrolyte concentration of extracellular and intracellular fluid may be important factors through which the effects of these diverse agents may be mediated. Accordingly, the electrocardiographic effects of rapidly administered molar sodium lactate or potassium chloride or both were observed in Navy recruits ill with or convalescing from acute rheumatic fever, in the hope that an exaggerated response would be helpful in predicting those whose recovery would be delayed or who were liable to relapse after return to duty. The fact that the average period of hospitalization was 104 days[12] and that up to 20 per cent of those returned to active duty have a relapse, serves to emphasize the importance of rheumatic fever to the Armed Forces.

MATERIALS AND METHODS

Twenty-two male patients, aged 17 to 24 years, under treatment for acute rheumatic fever as established by Jones'[13] criteria, were selected for study. Five had had previous attacks of rheumatic

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fever, including two with two previous episodes. Two additional patients, one with rheumatic heart disease with 2:1 A-V block and one with complete A-V block due to arteriosclerotic heart disease, also were studied. The majority of rheumatic fever subjects received aspirin, cortisone, or both during the period of study; the nonrheumatic subjects received no therapy. All subjects demonstrated some type of ECG abnormality at some time during their illness, but not necessarily at the time of study.

The interval that elapsed between onset of disease and investigation varied from two to seven days in all except two individuals who were studied during the second and fourth week of their illness while the disease was still active. Five subjects were studied on two occasions. In most cases the studies were carried out at least two hours after eating, but no special effort was made to ensure a uniform time interval with respect to meals for the group as a whole. Normal renal function was present in all subjects.

A routine 12-lead ECG was obtained on each subject shortly after admission to the hospital, and therefore any anxiety connected with this procedure could be expected to be less on a subsequent occasion. The three standard limb leads were recorded as a base line and, unless otherwise noted, only lead II was obtained during the study. Blood for serum sodium and potassium was obtained before and immediately after the infusion.

Sodium Lactate. Eleven subjects with acute rheumatic fever received 200 mEq of 1 molar sodium lactate* intravenously within 8 to 10 minutes, and 2 of the 11 received an additional 200 mEq on a second occasion. The same material was given to 2 subjects, with the following conditions: inactive rheumatic heart disease with complete A-V block, and arteriosclerotic heart disease with 2:1 A-V block.

Potassium Chloride. Ten subjects received 40 mEq of KCl dissolved in 1,000 ml of 5 per cent *d*-glucose solution intravenously within 40 to 60 minutes. Six additional patients received this solution immediately following the infusion of 200 mEq of sodium lactate.

RESULTS

Sodium Lactate Side Effects. Symptoms and signs of tetany appeared in every subject, usually after the first 100 mEq of lactate was infused. Numbness, tingling, and muscle cramps appeared regularly. Chvostek's sign was elicited only occasionally. In no case were the side effects sufficiently distressing to interrupt the infusion, and they disappeared within a few minutes after infusion was completed.

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*Kindly furnished by Abbott Laboratories, North Chicago, Ill.

Potassium Chloride Side Effects. Pain, believed to be of venous origin, appeared in the elbow, arm, or shoulder of all those who were given KCl, with one exception. In two subjects not included in this study, the pain was severe enough to make it necessary to discontinue the infusion. Pain, and occasionally tenderness, persisted in the involved area for an hour or more, but no other objective evidence of thrombophlebitis or thrombosis appeared.

Serum Sodium and Potassium. As shown in table 1, there was no significant change in the serum concentration of either sodium or potassium. The data indicate that KCl tended to reduce serum sodium whether or not sodium lactate was given first. In 7 of 20 subjects, there was a fall in serum sodium of 10 mEq/l or greater, the maximum fall being 17.5 mEq/l. Serum potassium was significantly elevated only when KCl was given alone, the maximum rise being 1.9 mEq/l.

Significant ECG Effects. In subjects with sinus rhythm, the P-R interval remained unchanged. As shown in table 1 and the subsequent figures, T-wave amplitude decreased but only rarely did T become negative. The Q-T_c interval was regularly prolonged. In two patients with interference dissociation, lactate restored the rhythm to normal sinus rhythm (fig. 1).

Figures 2 and 3 illustrate two examples of a shifting pacemaker. While no effect on rhythm or A-V conduction was observed

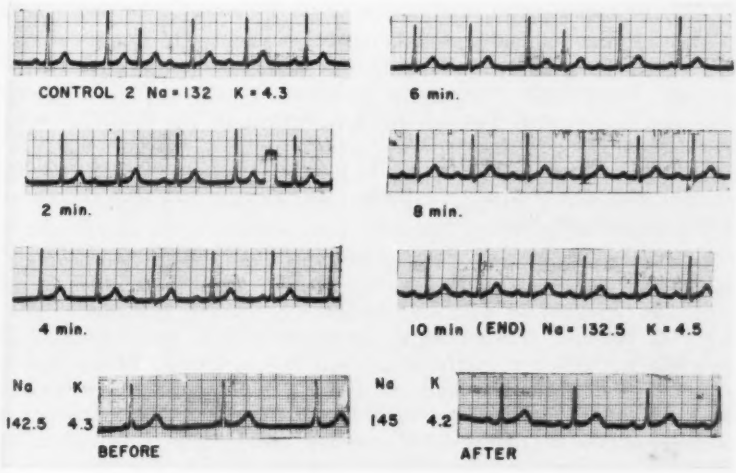

Figure 1. The effect of molar lactate infusion (200 mEq) on two subjects with acute rheumatic fever, showing interference dissociation on the electrocardiogram. The upper three strips of each column are from the same individual and the lower two are those of another individual before and after the infusion. Note change in rhythm from interference dissociation to sinus rhythm.

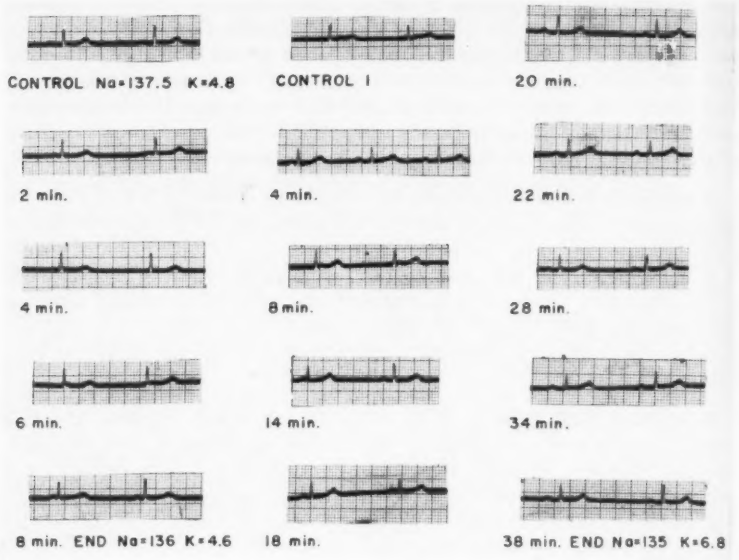

Figure 2. Example of shifting pacemaker resulting from infusion of molar lactate, and restoration to control state by KCl. The earlier changes in the first few minutes of KCl administration are probably still due to the lactate infusion (see text).

in the 24-year-old subject with inactive rheumatic heart disease and complete A-V block, aggravation of A-V conduction did occur in the 45-year-old subject with arteriosclerotic heart disease (fig. 4). In this case the 2:1 block observed in the control tracing changed to temporary complete block during the infusion and later reverted to the control status. The atrial rate increased from 80 to 100 per min (table 1), whereas the ventricular rate increased from 40 to 43 per min.

As shown in table 1 and in figure 5, KCl administration produced a striking reduction in P-wave amplitude, while the P-R interval remained unchanged with one exception. In this instance (fig. 6) the P-R interval intermittently varied from 0.20 seconds to 0.28 seconds without a significant change in heart rate. There was no effect on P-R interval when the study was repeated using 40 mEq of NaCl on the following day. The difficulty in measuring P-R interval when a portion of P may be isoelectric is obvious, so that A-V conduction cannot really be evaluated.

The effect of KCl on P-wave amplitude varied, depending on whether it was given alone or immediately following lactate. In the former case a significant decrease occurred, but there was no significant change when KCl followed sodium lactate. Figure 4

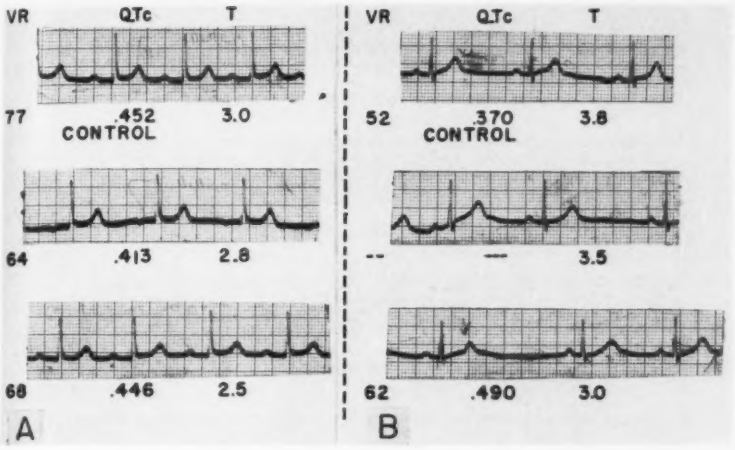

Figure 3. Another example of shifting pacemaker (A) (sinus to nodal) resulting from lactate administration. The change in rhythm was temporary, but on return to a sinus pacemaker the prolonged P-R interval persisted. The effect of lactate on Q-T_C interval, T, and rhythm regularity (B). The Q-T_C interval is considerably prolonged, T decreased in amplitude, and the rhythm markedly irregular. The arrow in the lower strip points to a blocked P wave that arrived during the refractory state.

shows how KCl induced intermittent first degree A-V block that could not be reproduced by NaCl in the same concentration on the following day.

The arrhythmia induced by lactate administration often was restored to its former state by subsequent KCl administration (fig. 2). In contrast to the effect of sodium lactate, T-wave amplitude greatly increased following KCl infusion and was most evident in those subjects in whom the T wave had been depressed by prior lactate administration. T-wave amplitude increased 1 mm or more in 12 of 20 experiments, and in 3 subjects increased 2 mm. The Q-T_C interval itself was not significantly altered. The slowing of the ventricular rate (due to slowing the rate of discharge of impulses from the pacemaker) is evident from table 1.

DISCUSSION

That pH and certain electrolytes, chiefly K^+, Ca^{++}, and Mg^{++}, influence rhythmicity and conduction of impulses in the heart, has been known for many years. Sympathetic and vagal activity also are recognized as important conditioning influences. It always is difficult to evaluate a single factor, because others may be changed in the process. For example, the effect of the sodium lactate may be attributed more to the change in pH than to the sodium or lactate ions themselves.[14-16] Indeed, Bellet, Wasserman, and Brody[15] found no consistent alteration in serum sodium follow-

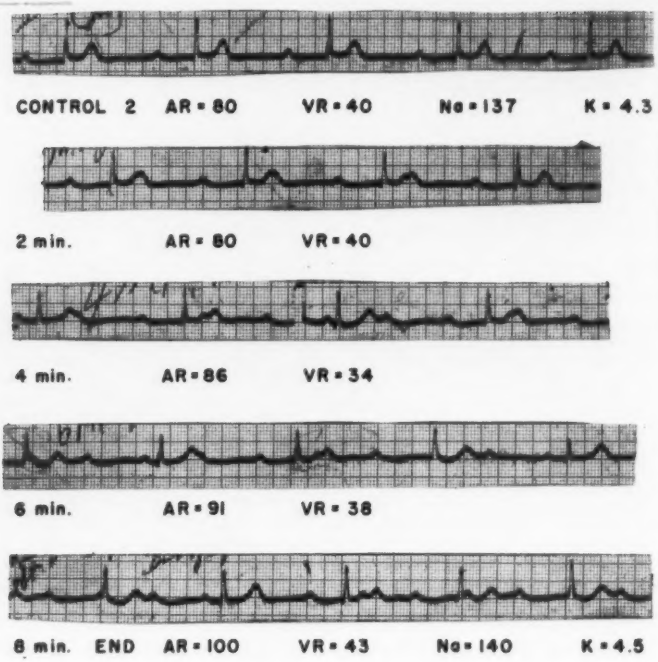

Figure 4. The effect of molar lactate infusion on a 45-year-old man with arteriosclerotic heart disease and 2:1 A-V block. The earliest effects are evident in the separation of alternate P waves from the T waves; however, complete A-V dissociation ultimately developed.

ing lactate administration, but regularly found a fall in serum potassium. As also noted by others,[14, 17] however, no correlation was found between serum electrolytes and ECG changes.

The failure to demonstrate a significant fall in serum potassium following lactate administration in this study may be attributed to the early timing of sampling. The maximum drop in serum potassium occurs one hour after lactate administration. This explanation might also apply to different effects on P-wave amplitude that were noted. When the drugs were given in sequence, the depressant effect of KCl on P-wave amplitude was probably counteracted by the opposite effect of the prior lactate administration. Bellet and associates[15] found no significant drop in total serum Ca with lactate administration, but the ionizable fraction was not determined.

The most interesting results of this study were those involving A-V conduction or rhythm changes. In general, A-V conduction was accelerated by sodium lactate, but on one occasion 2:1 A-V

TABLE 1. *Serum electrolyte values and electrocardiographic measurements after intravenous administration of sodium lactate and potassium chloride*

	Na lactate				KCl alone				KCl following Na lactate			
	N	Before	After	t	N	Before	After	t	N	Before	After	t
Na (mEq/l)	12	134.5	136.5	0.93	10	139.5	135.3	1.88	8	137.5	130.0	1.58
K (mEq/l)	12	4.6	4.6	1.40	12	4.5	5.1	2.02*	7	4.6	4.7	1.74
P (mm)	-	-	-	-	12	0.84	0.56	2.48*	7	0.33	0.47	1.93
P-R (sec.)	9	0.22	0.20	1.77	11	0.17	0.18	-	7	0.22	0.23	0.49
T (mm)	12	2.3	1.7	2.50*	13	2.60	3.35	2.27*	8	1.5	2.6	2.31*
Q-T_c (sec.)	11	0.415	0.457	2.35*	10	0.412	0.411	-	7	0.438	0.409	1.81
Rate (per min.)	-	-	-	-	13	79.6	72.2	2.10*	8	83.0	72.0	2.06

*$P = .05$
$<$

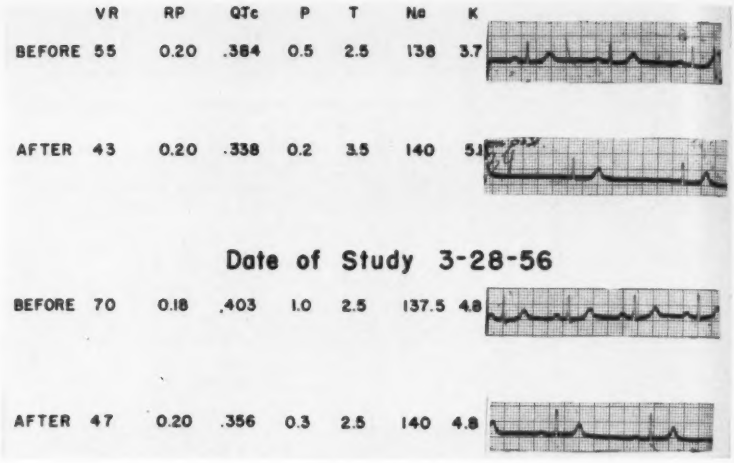

Figure 5. The effect of KCl infusion on P- and T-wave amplitude on the same individual studied on two different occasions. Slowing of the heart rate in each case may be noted.

block was changed to complete block. This change was associated with a moderate increase in atrial rate (from 80 per min to 100 per min), but with little increase in ventricular rate (from 40 per min to 43 per min). This is of special interest, because lactate is currently recommended for use in complete block with slow ventricular rate.

In this connection, Scherf, Goldfarb, and Bussan[9] found that paroxysmal tachycardia of apical or ventricular origin temporarily disappeared with hyperventilation. They believed that alkalosis was responsible. The opposite effect, that of acute respiratory acidosis produced by administering 30 per cent carbon dioxide to mentally disturbed patients, resulted in a high incidence of atrial and ventricular irritability with the production of ectopic beats and bursts of tachycardia.[18]

Certain well-known effects of KCl administration were readily noted in this study—decrease in P-wave amplitude, slowing of the heart rate, and increase in T-wave amplitude. No untoward effect on rhythm or ventricular conduction was noted when KCl was given rapidly to patients with acute rheumatic fever and normal renal function. In only one subject was intermittent P-R interval prolongation noted during the KCl infusion. In fact, in several instances of arrhythmia induced by sodium lactate, the administration of KCl restored the rhythm to its previous state.

The KCl study was planned initially as a possible means of predicting relapses in rheumatic fever. Had it been possible to

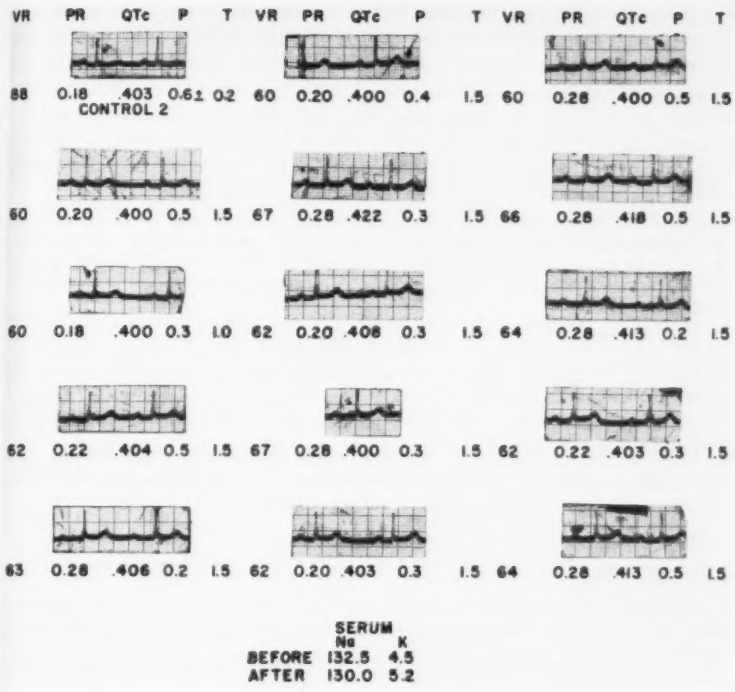

Figure 6. Intermittent first degree A-V block produced by KCl infusion. This is the only instance of P-R interval prolongation noted with KCl. The usual effects on P- and T-wave amplitude and heart rate are conspicuously absent. The study repeated on the following day using NaCl in the same concentration in place of KCl had no effect (ECG not shown).

single out the relapse-prone individuals by demonstrating in them an exaggerated response to KCl, a potential toxic agent, then such subjects could be maintained under treatment for a longer period and be retested periodically. The value of this test has not as yet been demonstrated by follow-up data, and more information is necessary. Inasmuch as up to 20 per cent of those returned to duty may relapse, such a prognostic aid would be very useful.

SUMMARY

The acute effects of rapidly administered one molar sodium lactate (200 mEq in 8 to 10 min), or KCl (40 mEq in 40 to 60 min), or a combination of the two, were observed in young men ill with or convalescing from acute rheumatic fever. Most showed some ECG abnormality during the course of their disease. Sodium lactate did influence rhythmicity in 50 per cent of the subjects

and temporarily restored interference dissociation to sinus rhythm in two patients. Potassium chloride only occasionally affected rhythmicity but regularly affected P- and T-wave amplitudes. Electrocariographic effects could not be correlated with serum sodium or potassium changes. The response to either lactate or KCl administration for use as a prognostic aid in predicting the time required for recovery or relapse rate has not yet been evaluated.

ACKNOWLEDGMENT: I wish to thank Dr. Richard E. Bates for referring the clinical cases for study; Capt. Victor G. Colvin, MC, USN, for support and encouragement; and corpsmen of the electrocardiographic laboratory for technical assistance.

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PORTAL CIRRHOSIS

A Study of 100 Consecutive Autopsied Cases

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THIS report concerns 100 consecutive cases of cirrhosis of the liver in which autopsies were performed at this hospital between 1949 and 1956. Only the Laennec and postnecrotic types were included, excluding various types of obstructive cirrhosis. Many aspects of these cases were studied, including age; cause of death; presence of hepatomegaly and splenomegaly; incidence of complications that were direct results of the liver disease, such as esophageal varices, esophageal and gastric hemorrhage, icterus, ascites, anasarca, hepatoma, biliary tract disease, acute tubular necrosis, hyperplasia of the prostate, and testicular atrophy; and incidence of incidental pathology that probably was not related to the liver disease, such as peptic ulcer, cardiovascular diseases, renal diseases, various infectious diseases, and malignant tumors not primary of the liver.

These findings are presented as observations, and speculations as to the relationships of diseases associated with cirrhosis will be kept to a minimum. It is well known that some conditions, such as esophageal varices, are obviously and directly associated with cirrhosis. Others, such as hepatoma and hyperplasia of the prostate gland, probably are related to cirrhosis, although not in so obvious a fashion. Still others, such as cardiovascular diseases, apparently are not related except that their incidence is decreased in liver disease.

The cases in this series, which was restricted to the so-called portal or diffuse nodular cirrhosis, were divided into: (1) the common finely nodular type, referred to as Laennec's or alcoholic cirrhosis, of which there were 88 cases; and the postnecrotic type, of which there were 12. The groups were identified by these criteria: (1) history of alcoholism, (2) history of hepatitis, (3) gross appearance of the liver, and (4) microscopic appearance of the liver.

It is realized that perhaps the criteria are over-simplified and that clinicians often use other observations for differentiating

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the two types of cirrhosis. In fact, considerable difficulty was encountered in separating the two groups. The extent or even the presence of alcoholism and nutritional deficiency as judged from the history alone often is impossible to assess. The attack of hepatitis may have taken place as long as 30 years previously. It may have been forgotten or misdiagnosed, or have been anicteric or subclinical. There is no reason why a chronic alcoholic may not contract hepatitis, nor why a hepatitis victim may not, prior to or after his infectious disease, develop chronic alcoholism.

In assessing these cases in retrospect, it was found that the gross and microscopic picture of the liver was the only reasonably accurate method of differentiation, and even this was beset by many errors. In fact, many authorities refuse to place much credence on such physical observations, and the statement often is made that both types of cirrhosis, if they progress to their inexorable conclusion, result in a shrunken, scarred, and atrophic liver, at which stage the causative agents and course can only be guessed at.[1-3]

In this study, relatively finely nodular livers with pseudolobules that were diffusely distributed and outlined by relatively narrow zones of fibrous tissue, and often showing fat vacuoles in the liver cells, were designated as the Laennec type. Conversely, the coarsely nodular livers with pseudolobules scattered in irregular distribution and outlined by relatively abundant connective tissue, and with no fat in the liver cells, were considered to be of the postnecrotic type.

It is obvious that the number of cases of postnecrotic cirrhosis was too small for the findings to be statistically significant. Apparently other institutions have a similiar dearth of postnecrotic cirrhosis cases. The largest published series included only 43 cases.[3] In regard to a few aspects, however, a comparison may be interesting or even significant. Age of death in patients with cirrhosis, is shown in table 1. Our data correspond to other reported series which indicated that cirrhosis has a peak incidence during middle age. In most series, however, postnecrotic cirrhosis appears to have involved a younger age group, in both its inception and its fatal terminations,[3] than was found in our series. Of more interest and importance would be the average and mean age at onset of the disease and the length of survival after onset, but this information was not available in a large number of cases.

TABLE 1. *Age distribution in 100 cases of portal cirrhosis that came to autopsy*

Type of cirrhosis	Number of cases	Number under 40 years	Average age in years	Range of age in years
Laennec's	88	7	52.9	31-78
Postnecrotic	12	1	58.0	27-78

Causes of death are listed in table 2 according to what was considered to be the immediate cause. Here again there was some difficulty in judgment. In most cases, the cirrhosis was severe enough to contribute actively to the patient's death. Eighty-one per cent of the patients with Laennec's cirrhosis and 83 per cent of those with postnecrotic cirrhosis died as a result of hepatic failure or hemorrhages from esophageal varices, which are the usual causes of death in these cases. A few developed fatal hepatorenal syndrome or hepatoma, which may or may not be considered direct derivatives of hepatic cirrhosis. The remainder died from unrelated causes, and in a number of cases the diagnosis of cirrhosis was made only at autopsy. Approximately 10 per cent of our patients with Laennec's cirrhosis, although exhibiting definite cirrhosis at autopsy, did not develop sufficient signs or symptoms to lead to suspicion of cirrhosis clinically. In a few, signs of cirrhosis were masked or confused by the presence of other diseases.

TABLE 2. *Immediate cause of death in 100 patients with portal cirrhosis*

Immediate cause of death	Laennec's cirrhosis		Postnecrotic cirrhosis	
	Number	Per cent	Number	Per cent
Hepatic failure	47	53.4	7	58.3
Hemorrhage, esophageal varices	24	27.3	3	25.0
Hemorrhage, duodenal ulcer	2	2.3		
Hepatorenal syndrome	5	5.7		
Cardiac disease	4	4.5	2	16.7
Carcinoma	3	3.4		
Acute pancreatic necrosis	2	2.3		
Trauma	1	1.1		
Total	88	100.0	12	100.0

In this study the cause of death did not differ significantly between Laennec's and postnecrotic cirrhosis. Over half of both types of patients died in hepatic failure and about one fourth were exsanguinated from varices of the esophagus.

As shown in table 3, the liver at time of death tended to weigh more than normal. In other words, most of the deaths occurred well before the stage of atrophic, shrunken liver had been reached. In the Laennec cases, the excessive weight was due to abundance of fat; these livers were invariably enlarged in dimensions as well as in weight. The increased weight of the liver in postnecrotic cases was due to increased scar tissue, and the weight bore no relation to the size. In fact, most such livers were relatively small in size. A greater proportion of livers of patients

with postnecrotic cirrhosis were of abnormally low weight as well as of small size, than were the livers of patients with Laennec's cirrhosis.

TABLE 3. *Weight of liver in 100 cases of portal cirrhosis*

Type of cirrhosis	Number of cases	Over 1,700 g	Under 1,300 g	Average wt. in g	Range of wt. in g
Laennec's	88	60	12	2,276	1,050-5,000
Postnecrotic	12	6	4	1,920	950-3,250

The average weight of spleens in our cirrhosis cases, as can be seen in table 4, was considerably increased, using 300 grams as the upper limit of normal. The average weight was greater in postnecrotic cirrhosis than in Laennec's cirrhosis, but the range from minimum to maximum was considerably greater in Laennec's cirrhosis, as would be expected from the larger number of cases. In a few instances, spleens were under 100 grams in weight. These can be explained only by postulating the presence of anomalous or damaged splenic venous circulation. The series reported by Baggenstoss and Stauffer[3] showed similar findings, with 67 per cent splenomegaly in postnecrotic cases and 80 per cent in Laennec's cirrhosis. Most series have shown an increased incidence of splenomegaly in Laennec's over postnecrotic cirrhosis. The reasons for this have never been explained. Some studies seem to indicate that splenomegaly increases in incidence with the duration of the cirrhosis, and that shrunken, atrophic livers are more apt to be associated with very large spleens.

TABLE 4. *Weight of spleen in 100 cases of portal cirrhosis*

Type of cirrhosis	Number of cases	Over 300 g	Average wt. in g	Range of wt. in g
Laennec's	88	66	367	60-1,200
Postnecrotic	12	8	435	250-755

Our study suggests that patients with postnecrotic cirrhosis are more prone to develop esophageal varices but are less apt to bleed from them (table 5). This is in contrast to most of the prior studies, which have shown a greater incidence of varices, as well as of hemorrhages, in Laennec's cirrhosis. Baggenstoss and Stauffer found that 75 per cent of their patients with Laennec's cirrhosis had varices and 27 per cent hemorrhaged; of their postnecrotic cases, only 37 per cent had varices and 16 per cent hemorrhaged. Our series is in agreement with others in showing that patients with postnecrotic cirrhosis are less prone to develop significant esophageal bleeding. The reason for this is undetermined.

TABLE 5. *Incidence of esophageal varices in 100 cases of portal cirrhosis*

Type of cirrhosis	Number of cases	Number of varices	Number with hemorrhage	Number without hemorrhage
Laennec's	88	57	36	21
Postnecrotic	12	9	3	6
Total	100	66	39	27

The incidence of peptic ulcer in cirrhotics has been investigated extensively and much has been written about it. Most authorities agree that acute peptic ulcer appears to be entirely unrelated to cirrhosis, but that the incidence of chronic peptic ulcer is increased in portal cirrhosis. As shown in table 6, chronic ulcer was present in 8 of the 100 cases in our series. Palmer and Brick,[4] in a series of 150 cases, found 10 with peptic ulcer, an incidence of 7 per cent. In 302 cases of cirrhosis, Lipp and Lipsitz[5] found 5 per cent with active chronic ulcer and 11.5 per cent with scars from healed ulcers. Autopsy studies showed that 33 per cent had some form of gastric lesion other than ulcer, chiefly gastritis. Schnitker and Hass[6] reported a 19.5 per cent ulcer incidence in cirrhotics.

TABLE 6. *Incidence of peptic ulcer in 100 cases of portal cirrhosis*

Type of cirrhosis	Number of cases	Number of ulcers	Gastric ulcer		Duodenal ulcer	
			Chronic	Acute	Chronic	Acute
Laennec's	88	11	3	1	4	3
Postnecrotic	12	3	—	1	1	1
Total	100	14	3	2	5	4

Cause and effect relationship between cirrhosis and ulcer are obscure. It has been shown many times that liver function often is impaired in patients with chronic peptic ulcer, as revealed by laboratory tests.[7] It has been the experience at this hospital that many deaths following gastric resection for ulcer have been at least in part due to liver disease, chiefly fatty metamorphosis. Statistics in regard to this have not been tabulated. Some writers have stated that cirrhosis predisposes to peptic ulcer, possibly because of vitamin A deficiency or hypoglycemia with gastric hypersecretion.[8] Our figure of 8 per cent of cirrhosis patients with chronic ulcer is considerably greater than the ulcer incidence found in other series of 100 consecutive autopsies and in con-

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secutive series of other diseases, such as cardiovascular disease or carcinoma.

Chronic gallbladder disease, including cholecystitis, cholelithiasis, or a combination of the two, is shown in table 7. Cholecystitis, with or without calculi, was listed separately from cholelithiasis in the absence of detectable inflammation. Type of calculi was not studied. Other series studied have shown similar findings. In fact, a series of 500 cases of cirrhosis reported by Bucalo[9] showed 13.6 per cent with gallbladder calculi, as compared with 13.2 per cent in normal control series.

TABLE 7. *Incidence of disease of gallbladder and pancreas in 100 cases of portal cirrhosis*

Type of cirrhosis	Number of cases	Cholecystitis	Cholelithiasis	Fibrosis of pancreas	Necrosis of pancreas
Laennec's	88	5	12	11	3
Postnecrotic	12	1	1	3	—
Total	100	6	13	14	3

In this series, 14.0 per cent of the cases showed fibrosis of the pancreas. This lesion has been mentioned prominently, for many years, as associated with cirrhosis. In most cases, clinical evidence of pancreatic insufficiency has been masked by the cirrhosis and the pancreatic fibrosis has been found only at autopsy. It is widely thought that the same factor probably causes both hepatic and pancreatic disease.

In our series carcinoma, excluding hepatoma, does not appear to have any significant relationship to cirrhosis (table 8). Many studies have been made in an attempt to establish a positive or negative correlation between cirrhosis and malignant disease. Theoretically, the presence of disturbances in steroid metabolism in cirrhosis should predispose to several types of malignancy, but the studies have shown wide variation and do not appear to establish any relationship. It has long been known that hepatoma often is associated with cirrhosis. Of interest is the 4 cases of hepatoma seen in our 12 cases of postnecrotic cirrhosis. This high incidence has been noted in other series.[10]

TABLE 8. *Carcinoma associated with portal cirrhosis in 100 cases*

Type of cirrhosis	Number of cases	Liver	Prostate (latent)	Larynx	Floor of mouth	Bronchus	Colon	Kidney	Esophagus
Laennec's	88	4	5	1	1	0	1	1	0
Postnecrotic	12	4	2	1	1	2	0	0	1
Total	100	8	7	2	2	2	1	1	1

Cardiovascular diseases, chiefly arteriosclerotic, have long been known to occur with decreased frequency in cirrhosis.[11] In this series, only one patient developed an acute coronary thombosis (table 9). Twenty-nine per cent of our patients showed old myocardial scars. This is roughly comparable with noncirrhotic patients of similar age groups. There is a striking paucity of cerebrovascular disease (2 per cent), when we consider the age group with which we are dealing. Likewise, the presence of systemic hypertension, with an incidence of 10 per cent, is low when the age group is considered. Criteria used for hypertension were blood pressure above 150 over 90 mm Hg, or heart weight over 400 grams. Heart weight was used in most instances because many patients were admitted in a state of shock and their prior blood pressure was not known. Hall, Olsen, and Davis,[12] in reviewing 782 autopsy protocols of patients with cirrhosis, discussed this subject thoroughly.

TABLE 9. *Incidence of cardiovascular diseases in 100 cases of portal cirrhosis*

Type of cirrhosis	Number of cases	Coronary thrombosis		Cerebrovascular diseases (old)	Hypertension
		Acute	Old		
Laennec's	88	1	26	1	8
Postnecrotic	12	0	3	1	2
Total	100	1	29	2	10

There have been many speculations as to the reasons for reduced arteriosclerosis and hypertension in cirrhosis, but no final or convincing answer has been presented. Theories include: (1) Alcohol, itself, is a vasodilator. (2) The diseased liver may release excess vasodepressor substances or may fail to inactivate them. (3) The diseased liver may fail to manufacture vasopressor substance. (4) The diseased liver may interfere with metabolism or transportation of abnormal lipid material that otherwise would play a part in the development of arteriosclerosis. (5) Dietary deficiencies concerned in the etiology of cirrhosis may impede the development of arteriosclerosis.

It would be of great interest to study a larger series of postnecrotic cirrhosis cases to determine the incidence of arteriosclerotic cardiovascular disease, and thus assess the effect of alcohol and diet. One might suspect in this series that arteriosclerosis and hypertension in postnecrotic cirrhosis may approach the normal group in incidence. Our 12 cases, however, are too small in number to justify such a conclusion.

Incidence of the chronic renal diseases, as shown by the first three listed in table 10, does not appear to be significant. A number of studies, chiefly in the foreign journals, describe obscure changes in the kidneys in cirrhosis, none of which appear to conform to recognizable disease entities. "Acute tubular necrosis" is seen in kidneys of patients in shock and "hepatorenal syndromes." These entities are thought to be similar conditions, the latter representing the consequence of severe or prolonged shock, resulting in renal failure. Either may occur after shock resulting from hepatic failure or hemorrhage. A nephrotoxin produced by the failing liver has been postulated by some authorities as the cause of the "hepatorenal syndrome," but this theory is currently viewed with suspicion. The single case of bilateral cortical necrosis was regarded as coincidental.

TABLE 10. *Incidence of renal disease in 100 cases of portal cirrhosis*

Type of cirrhosis	Number of cases	Nephrosclerosis	Glomerulonephrosis	Pyelonephritis	Necrosis	
					Acute tubular (including hepatorenal syndrome)	Bilateral cortical
Laennec's	88	13	1	2	12	1
Postnecrotic	12	3	0	1	1	0
Total	100	16	1	3	13	1

Testicular atrophy is well-known and frequent complication of cirrhosis, and occurred in 71 of our cases (table 11). This of course is much higher than in normal controls of the same age group, but not much higher than in cases of cachexia due to such diseases as terminal carcinoma. It always has been assumed that testicular atrophy is caused by increased amounts of es-

TABLE 11. *Incidence of diseases of the genitourinary tract (excluding the kidney) in 100 cases of portal cirrhosis*

Type of cirrhosis	Number of cases	Testicular atrophy	Hyperplasia of prostate	Carcinoma of prostate (latent)
Laennec's	88	62	31	5
Postnecrotic	12	9	7	2
Total	100	71	38	7

trogenic hormone, which is not inactivated adequately by a cirrhotic liver. It also is known, however, that similar atrophy is common in severe malnutrition, inanition, and all chronic wasting diseases. No statistical comparison has ever been made of these conditions in regard to testicular atrophy.

Hyperplasia of the prostate in relation to cirrhosis has been the subject of numerous surveys.[13-15] These have varied widely, some showing an increased incidence of hyperplasia in cirrhosis, and others a reduced incidence. This is probably due to confusion in criteria for the diagnosis of hyperplasia of the prostate. Our series, with a total of 38 per cent is somewhat low. The expected incidence in the age group investigated here (50 to 60 years) is about 50 per cent.

The 7 per cent incidence of latent carcinoma of the prostate in this series may be misleading. In most of the series that have been reported, where such lesions were looked for by making a wider survey of prostatic tissue, there was an incidence of 15 to 20 per cent in all patients over the age of 50. This figure has been found to hold true at this hospital, when the lesion was looked for by taking numerous blocks of the prostate. However, this was done in only a few cases of this series, and our percentage may be too low for that reason. It has been theorized that the high estrogen level in cirrhosis may block the development of prostatic carcinoma. Statistics from other hospitals neither confirm nor deny this. Other evidence of a hyperestrogenic state in cirrhosis, such as gynecomastia and skin and hair changes, were not noted adequately in the autopsy protocols of these patients.

Incidence of icterus, ascites, and anasarca in this series is reported as a matter of interest, but the percentages found do not appear particularly significant (table 12).

TABLE 12. *Incidence of icterus, ascites, and anasarca, in 100 cases of portal cirrhosis*

Type of cirrhosis	Number of cases	Icterus	Ascites	Anasarca
Laennec's	88	44	50	17
Postnecrotic	12	8	12	4
Total	100	52	62	21

Seven of the cirrhosis patients also had diabetes mellitus. Random sampling of autopsy protocols of patients at this hospital show that this incidence of diabetes is not significantly increased, although it is well known that disturbances in carbohydrate metabolism are rather common in cirrhosis as well as in other

chronic liver diseases.[16] It also is known that diabetes is often complicated by hepatic changes, occasionally including portal cirrhosis.[17] A number of series have been published, the majority of which do not find increased incidence of diabetes in cases of cirrhosis, the incidence ranging from 1 to 7.6 per cent.[18] Several studies have shown a slightly increased incidence of cirrhosis in large groups of patients with fatal diabetes. The incidence of infections, including tuberculosis, was remarkably low in our group of cases (table 13). Various studies have shown a much higher incidence of infections, chiefly pneumonia and peritonitis, which were listed as the chief cause of death. Infectious diseases were listed as the chief cause of death in 33 per cent of the 782 cases from Los Angeles County Hospital, reported on by Hall, Olsen, and Davis. Infection was not the cause of death in any of the patients in our series. Many cases in other series, however, extend back to preantibiotic days. A number of series are from large city and county hospitals where many cirrhotics were derelicts admitted in terminal condition.

TABLE 13. *Miscellaneous conditions associated with 100 cases of portal cirrhosis*

Type of cirrhosis	Number of cases	Diabetes mellitus	Tuberculosis (active pulmonary)	Bronchopneumonia (including aspiration)	Aortic stenosis (calcific)
Laennec's	88	6	6	11	3
Postnecrotic	12	1	0	0	0
Total	100	7	6	11	3

SUMMARY

In investigating the anatomic features and associated pathology of 100 cases of portal cirrhosis (88 of the Laennec type and 12 of postnecrotic type) it was found that in comparing Laennec's and postnecrotic cirrhosis cases about 50 per cent of both groups died in hepatic failure, 25 per cent as a result of hemorrhage from esophageal varices and 25 per cent from other causes. Postnecrotic cirrhosis was more often associated with esophageal varices, but less often with hemorrhage from varices. The incidence of chronic cholecystitis, cholelithiasis, and pancreatic fibrosis was increased in cirrhosis cases. The incidence of carcinoma, other than hepatoma, was not materially affected. Hepatoma was present in one third of all postnecrotic cirrhosis cases. The incidence of systemic hypertension and arteriosclerotic cardiovascular disease was decreased in cirrhosis, while the incidence of chronic renal disease was not affected. Testicular atrophy was increased and hyperplasia of the prostate was decreased in cirrhosis.

Postnecrotic cirrhosis patients appeared more prone to jaundice, ascites, and anasarca than were Laennec's cirrhosis patients in this study. Diabetes mellitus was not increased. The incidence of infections of all types in this series was much lower than in most other published series of cirrhosis cases.

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INSECTICIDE RESISTANCE IN HOUSEFLIES OF JAPAN, KOREA, AND THE RYUKYU ISLANDS

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THE PHENOMENON of resistance of the housefly, *Musca domestica,* to insecticides is now known to be of world-wide occurrence.[1] Resistance to DDT and lindane in and around U. S. Armed Forces installations has been suspected in Japan, Korea, and the Ryukyu Islands in late years, but no positive experimental observations had been recorded until Byers, Wheeler, and Blakeslee,[2] in a series of tests conducted in 1954-1955, reported four strains of houseflies from Japan and one strain from Okinawa to be moderately resistant to one or both of these insecticides. These laboratory tests at least partially confirmed field observations in areas where variations had been encountered in the apparent susceptibility of local strains of houseflies to the killing action of members of the chlorinated hydrocarbon group of insecticides.

With the exception of Ishigaki-shima, Ryukyu Islands, where no extensive program in the chemical control of houseflies has been carried out in past years, DDT, lindane, dieldrin, or malathion have been used practically continuously in Japan, Korea, and the Ryukyu Islands since 1945, and houseflies have exhibited signs of progressively developing resistance. The study reported herein concerns the comparative susceptibility of progeny of houseflies from these localities to the insecticides mentioned.

MATERIALS AND METHOD

A series of tests of housefly resistance to insecticides involving 13 strains of flies from Japan, Korea, and the Ryukyu Islands was begun in October 1955 and continued through May 1956. From October 1956 to June 1957 another series of tests was undertaken on 18 strains of flies originating on military establishments in Japan and the Ryukyu Islands, or within their immediate vicinities. No strains were received from Korea in the 1956-1957 series.

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The method of study was similar to that used by Byers, Wheeler, and Blakeslee. Colonies of houseflies collected from 13 areas in Japan, 6 areas in the Ryukyu Islands, and 1 area in Korea were established in the laboratory, and their progeny were employed for experimentation.

Adult flies originally obtained from each of the areas were housed in wooden-bottom, frame cages, 10 by 10 by 8 inches. Double walls of 18-mesh black-enameled screen enclosed the cage frame on the top and on three sides. A removable stockinet entrance sleeve was attached to the unscreened side. Approximately 20 ml of whole milk was provided daily as food."Baiting" for egg deposition was accomplished twice weekly.

Two-gallon glass animal jars, with removable cloth tops, were used as rearing chambers. Viable ova of each fly strain, in 3-ml measured amounts, were used to seed the cultures. Media in each jar consisted of 400 grams Chemical Specialty Manufacturers Association larval media, 900 ml water, 50 ml molasses, and 50 ml of a 50 per cent yeast solution. Larval cultures and adult colonies were maintained at a temperature of 27°C ± 2°C at approximately 70 per cent humidity. Upon reaching the last larval instar, sterilized dry sand, to a depth of 2 inches, was placed over the surface of the culture media in each jar to provide a suitable pupation site.

Pupae from each culture were divided into two lots, one lot to provide a continuous stock supply of flies, the second lot for experimental use. Stock flies were housed in screened cages. Experimental flies were housed in glass animal jars equipped with stockinet sleeves affixed over the mouth of each jar by a 1-inch band of masking tape. All cages and jars were labeled with data pertinent to the fly strain housed within.

Only adult female flies three to five days old were used in test procedures, as it had been found that males are more susceptible than females to insecticidal action.For ease of handling, experimental flies were first anesthetized within their rearing chamber with carbon dioxide gas, then transferred to a Buchner funnel and held under partial anesthesia for not more than 20 minutes. A longer period was found to be fatal to a majority of the flies.

Insecticides used in this investigation were obtained from Japanese insecticide manufacturers. A five-fold dilution ratio of 625 to 0.000064 (6.25×10^2 to 6.4×10^{-5}) micrograms of toxicant per ml of acetone for each of the four insecticides (DDT, lindane, dieldrin, and malathion) was prepared in 50-ml volumetric flasks and stored in a dark cabinet. This dilution ratio was selected as a matter of experimental convenience and to satisfy one condition of the Thompson[3] method, namely, that the doses of agent increase by a constant ratio.

By means of a microsyringe dispensing apparatus described by Trevan,[4] topical applications of 2 μl of solution for each dosage level of a given insecticide were administered to the dorsum of individual female flies in each of the test series. Acetone administered in the same manner was used in control groups.

Previously calibrated, ¼-ml tuberculin syringes, one for each insecticide and one for acetone control, were used. Syringes were rinsed three times in acetone before and after use and between each dosage level. Five pairs of forceps, similarly treated, were used to handle flies for each solution. Ten adult female flies were treated at each dosage level. A minimum of three complete replicas constituted a test series. Treated flies were transferred to 1-pint, wide-mouthed, Ball-type glass jars or to 400-ml glass beakers with double-layered, gauze covers. Each container was labeled as to fly strain, insecticide used, dosage, and date treated.

When a colony of flies was of sufficient strength for testing, a complete test series was conducted during one day's operation. Flies under test were held for 24 hours at 27°C ± 2°C, after which mortality was recorded for each dosage gradient of toxicant. Our criterion for death was complete cessation of all bodily activity. Tests in which more than one death occurred among control flies were discarded. "Knockdowns" and loss of muscular co-ordination were not considered as probable death.

The Thompson method for calculation of the median-effective dose (M_{50}) was employed in this study. This is the dose of a given agent at which half of the test subjects react critically. The median effective dose, like the median, is less affected by variation in the extremes of the data than is the LD_{50} and therefore is a more stable measure of central tendency. M_{50} values of 15 to 625 were considered to indicate high resistance; of 5 to 14.9, moderate resistance; of 1 to 4.9, low resistance; and below 1.0, susceptibility.

RESULTS

As seen in table 1, there was a notable increase in resistance to DDT between 1955-1956 and 1956-1957 in the 11 cases where strains from exactly the same locality could be compared in the two series. To a lesser extent, this also was true of resistance to lindane, dieldrin, and malathion; however, in no instance was there more than low resistance to malathion.

Ryukyu Islands: Of the six strains tested, high resistance to DDT only was found in four strains, while a fifth strain showed high resistance to both DDT and dieldrin. Moderate resistance to DDT occurred in the one strain from Ishigaki in the 1956-1957 series, whereas in the 1955-1956 series the strain from Ishigaki was susceptible to DDT. Neither high nor moderate resistance to lindane or dieldrin was observed. Low resistance to lindane

TABLE 1. *Median-effective dose values, in micrograms of each of four insecticides, exhibited by various strains of*

TABLE 1. *Median-effective dose values, in micrograms of each of four insecticides, exhibited by various strains of houseflies*

Source of fly strain	DDT		Lindane		Dieldrin		Malathion	
	1955 1956	1956 1957	1955 1956	1956 1957	1955 1956	1956 1957	1955 1956	1956 1957
Stable A, Yokohama	0.41	625.0	1.02	625.0	0.14	625.0	0.02	1.06
Stable B, Yokohama	31.0	625.0	5.03	4.64	7.19	625.0	0.04	1.06
Stable C, Yokohama	0.36	625.0	3.08	2.19	1.02	625.0	0.01	1.16
Garbage Dump, Yokohama	21.47	-	0.41	-	0.06	-	0.05	-
Garbage Dump, Tokyo	2.70	625.0	0.26	625.0	0.05	625.0	0.01	0.82
Washington Heights, Toyko	-	625.0	-	2.12	-	625.0	-	0.62
Camp Drake, Japan	2.77	625.0	0.53	0.49	0.05	625.0	0.001	1.81
Camp Drew, Japan	3.05	625.0	0.36	0.78	0.03	0.21	0.004	1.22
U. S. Army Supply Center, Japan	2.99	625.0	0.16	625.0	0.01	3.77	0.002	0.50
Garbage Dump, Sobudaimae, Japan	-	625.0	-	625.0	-	625.0	-	2.26
Johnson Air Base, Japan	1.17	625.0	0.49	625.0	0.05	625.0	0.02	1.46
Tachikawa Air Base, Japan	1.06	625.0	0.04	0.17	0.003	0.27	0.02	0.56
Fleet Activities (Navy), Yokosuka	5.18	625.0	0.43	625.0	0.001	625.0	0.02	1.40
Awase, Okinawa, Ryukyu Islands	-	625.0	-	1.17	-	22.3	-	0.58
Ishigaki, Yaeyama Gunto, Ryukyu Islands	0.28	5.74	0.28	0.26	1.63	4.98	0.002	0.46
Ishikawa, Okinawa, Ryukyu Islands	-	625.0	-	0.64	-	0.99	-	0.42
Itoman, Okinawa, Ryukyu Islands	-	625.0	-	0.40	-	3.29	-	0.59
Kadena Air Base, Okinawa, Ryukyu Islands	-	625.0	-	0.19	-	0.33	-	0.46
Naha Air Base, Okinawa, Ryukyu Islands	-	625.0	-	0.47	-	0.39	-	0.20
Seoul, Korea	0.23	-	0.17	-	0.43	-	0.02	-

only was noted in one strain, while two strains exhibited low resistance to dieldrin only. One strain was susceptible to malathion only, two strains to malathion and lindane, and three strains to malathion, lindane, and dieldrin.

Korea: Tests conducted in the 1955-1956 series showed the strain originating in a garbage dump near Seoul, Korea, to be susceptible to DDT, lindane, dieldrin and malathion. No strains from Korea were tested in the 1956-1957 study.

Japan: In the 1955-1956 series, 2 of the 11 strains tested showed high resistance to DDT only; none were highly resistant to the other three insecticides. One strain was moderately resistant to DDT only, and two strains to lindane and dieldrin. Six strains had low resistance to DDT only, one strain to lindane only, and one strain to lindane and dieldrin. One strain was susceptible to malathion only; one strain to dieldrin and malathion; one strain to DDT, dieldrin, and malathion, and eight strains to lindane, dieldrin, and malathion.

In the 1956-1957 series, high resistance to DDT was demonstrated in all of the 12 strains tested. Two strains exhibited high resistance to DDT only, one strain to DDT and lindane, four strains to DDT and dieldrin, and five strains to DDT, lindane, and dieldrin. No strains exhibited moderate resistance to any of the four insecticides. One strain possessed a low resistance to lindane only, one strain to dieldrin only, two strains to lindane and malathion, and six strains to malathion only. One strain was susceptible to lindane only; one strain to lindane and dieldrin; one strain to lindane, dieldrin and malathion; and three strains to malathion only.

DISCUSSION

Peculiarities in strains exhibiting resistance to one or more of the insecticides are of interest. One strain (Stable A, Yokohama) obtained from a cow stable near a U. S. Armed Forces Dependent housing area in Yokohama, Japan, exhibited high resistance to DDT, lindane, and dieldrin, but low resistance to malathion. Strains Stable B, Yokohama, and Stable C, Yokohama, originating in two similar stables within a one-half mile radius of the former, exhibited high resistance to DDT and dieldrin, and low resistance to lindane and malathion. DDT had been used in these stables over a period of about eight years, while lindane was first used in the summer of 1954 (table 2).

From June through October 1955, each of the three stables received a weekly application of malathion, dieldrin, and lindane on a five-week rotating schedule in a special study to determine the comparative efficacy of those insecticides. Flies collected from these stables following termination of that study were used in tests to determine M_{50} values in the second study series under-

TABLE 2. *Insecticides used in areas from which test strains of houseflies were obtained*

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Area	Prior to 1953	1953	1954	1955	1956
Stable A, Yokohama	DDT	DDT	lindane	lindane dieldrin malathion	malathion
Stable B, Yokohama	DDT	DDT	lindane	lindane dieldrin malathion	malathion
Stable C, Yokohama	DDT	DDT	lindane	lindane dieldrin malathion	malathion
Garbage Dump, Yokohama	DDT	DDT	DDT	lindane malathion	
Carbage Dump, Tokyo	DDT	DDT	DDT, BHC, malathion	dieldrin malathion	malathion
Washington Heights, Tokyo	DDT	DDT		lindane	
Camp Drake, Japan	DDT	DDT		lindane	
Camp Drew, Japan	DDT	DDT		lindane	
U. S. Army Supply Center, Japan	DDT	DDT		lindane	
Garbage Dump, Sobudaimae, Japan	DDT	DDT		lindane	

TABLE 2. *Insecticides used in areas from which test strains of houseflies were obtained*—Continued

Area	Prior to 1953	1953	1954	1955	1956
Johnson Air Base, Japan	DDT	DDT		lindane	
Tachikawa Air Base, Tokyo	DDT	DDT		lindane	
Fleet Activities (Navy), Yokosuka	DDT	DDT		lindane	
Awase, Okinawa, Ryukyu Islands	DDT	DDT	DDT chlordane		DDT, chlordane, dieldrin, lindane, malathion
Ishigaki, Yaeyama Gunto, Ryukyu Islands	DDT	DDT, chlordane, BHC dieldrin, endrin		DDT chlordane	
Ishikawa, Okinawa, Ryukyu Islands	DDT	DDT chlordane			DDT, chlordane, malathion
Itoman, Okinawa, Ryukyu Islands	DDT	DDT chlordane			DDT, chlordane, malathion
Kadena Air Base, Okinawa, Ryukyu Islands	DDT	DDT chlordane			DDT, chlordane, malathion
Naha Air Base, Okinawa, Ryukyu Islands	DDT	DDT chlordane			DDT, chlordane, malathion
Seoul, Korea	DDT	DDT chlordane			DDT, chlordane, malathion

taken in 1955-1956. New colonies from these stables also were established for the 1956-1957 study.

In tests with the three Yokohama stable colonies for two successive years, flies from Stable A and Stable B increased from susceptible to high resistance for DDT, while those from Stable C maintained their high degree of resistance for that insecticide. High resistance to lindane and dieldrin developed in the Stable A colony. Stable B and Stable C colonies developed a high resistance to dieldrin but maintained a low resistance to lindane. In all three stables an apparent increase in resistance to malathion was noted. In spray operations in these stables during the past 1½ years, 1 per cent malathion has been used at weekly intervals during the fly-breeding season.

In the 1955-1956 study, a strain reared from adult flies captured at the Yokohama Garbage Dump was shown to have a high resistance to DDT but was susceptible to lindane, dieldrin, and malathion. Only DDT had been used as the control agent for at least five years, with progressively marked decrease in effectiveness year by year. Malathion spray (1 per cent) applied late in the summer of 1955 quickly reduced the fly population by an estimated 98 per cent. The fly population at the dump has been kept at a low level since that time through the continued use of malathion.[5] Unfortunately, M_{50} values were not determined for this strain in the present study.

At the Tokyo Garbage Dump, DDT had been used in the control of houseflies for at least five years prior to August 1954, followed by benzene hexachloride (BHC) for a period of three months, after which time a study to determine the comparative efficacy of dieldrin and malathion was undertaken. The ineffectiveness of DDT and BHC was particularly noticeable in 1954. However, M_{50} values obtained in the 1955-1956 studies indicated only a low degree of resistance to DDT. The strain remained susceptible to lindane, dieldrin, and malathion. In the 1956-1957 study, it was demonstrated that flies from a newly established colony originating in the Tokyo dump had developed a high degree of resistance to the three chlorinated hydrocarbons used in this study, while susceptibility to malathion was maintained. Malathion has been the insecticide of choice since 1955 at the Tokyo dump. Findings of a somewhat similar nature were noted for flies originating from Johnson Air Base, Yokosuka Fleet Activities, and Yokohama Stable A.

Of the 13 strains from Japan and the Ryukyu Islands that were tested against DDT, only one strain, that from Ishigaki City, Ishigaki Island, of the southern Ryukyu Group, had not as yet developed high resistance. However, as the M_{50} values in the present study indicate, DDT resistance increased appreciably between 1955-1956 and 1956-1957, and the Ishigaki strain may develop high resistance to DDT by 1958.

In general, the housefly strains studied have demonstrated progressive development of resistance to DDT, lindane, dieldrin, and even malathion, one of the newer organic phosphate insecticides. Unless control methods against houseflies are modified to an extent whereby the use of the chlorinated hydrocarbon group of insecticides may be discontinued, fly strains presently exhibiting moderate or low resistance to these insecticides may be expected to show a continuing increase in resistance within a relatively short time. The apparent increase in resistance to malathion exhibited by the majority of the housefly strains tested is of interest and concern, but continued observations are necessary before any definite conclusion can be drawn as to the permanency of this phenomenon.

SUMMARY

The median-effective dose (M_{50}) values for DDT, lindane, dieldrin, and malathion were determined for 13 strains of houseflies from Japan, 6 strains from the Ryukyu Islands, and 1 strain from Korea. All strains, except one from Ishigaki, Ryukyu Islands, and one from Korea, were highly resistant to DDT, and five strains also showed high resistance to lindane and malathion.

An appreciable increase in resistance to DDT was noted for 11 strains originating in the same areas and tested in both the 1955-1956 and the 1956-1957 series. The same was true of 5 strains tested against lindane, 9 strains against dieldrin and 7 strains against malathion. A slight decrease in M_{50} values was recorded for 4 strains tested against lindane. In two such cases, strains from Yokohama Stable B and Yokohama Stable C, use of lindane spray had been discontinued for about one and one-half years. Low resistance to malathion was encountered in 8 of the 20 strains tested, the remainder being susceptible.

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Clinicopathologic Conference

Madigan Army Hospital, Tacoma, Wash.*

SYMMETRICAL SWELLING OF THE LONG BONES

Summary of Clinical History. A 9-week-old white female infant was hospitalized 9 October because her mother thought the child had a slight cold and noted gurgling sounds in her throat.

The infant was born with clubfeet, absence of both thumbs and both first metatarsal bones. Her birth weight was 7 pounds, 15 ounces. The infant did not gain in weight and several weeks prior to hospitalization she developed "swelling" of the long bones of the extremities. The mother stated that the infant had taken very little nourishment and after taking several swallows would then refuse further feeding. On the day of admission she took only 1½ ounces of formula. There had been some vomiting a week or so after birth. Her stools were normal.

One brother was reported to be normal and in good health. There was no history of familial disease.

Physical Examination. The patient was an extremely malnourished white female infant with very pale, dry skin. Her weight on admission was 6 pounds, 13 ounces, and her temperature was 98.6°F. The tongue was dry and coated. The ears were large. The throat was not congested. The neck revealed no abnormal findings. The thorax was symmetrical and the breasts were not enlarged. The lungs were resonant. Harsh breath sounds were heard over the anterior chest, suggestive of a pleural friction rub. No areas of dullness were heard posteriorly and the breath sounds were audible. No rales were heard. Auscultation of the heart revealed no murmurs. The abdomen revealed no tenderness, distention, or palpable masses. Examination of the back and genitalia revealed no abnormal findings. Both

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thumbs were absent, toes 1 and 5 of both feet were much shorter than the other toes. The long bones of the arms and legs, and the bones of the skull were described as "thickened."

Laboratory Studies. Red blood cells numbered 2,000,000 and the white blood cells, 30,000 per μl, with 2 per cent eosinophils, 1 per cent metamyelocytes, 13 per cent band forms, 65 per cent neutrophils, 1 per cent monocytes, and 18 per cent lymphocytes. The hemoglobin was 7 grams per 100 ml.

Course in Hospital. On admission the infant was dehydrated, anemic, and taking feedings very poorly. On 11 October, a whole blood transfusion of 75 ml was given intravenously. In addition the child received crystalline penicillin and Ringer's lactate-glucose solution by hypodermoclysis. Gavage was taken very poorly and was followed with the production of excessive mucus and some difficulty in respiration. There appeared to be resistance to the gavage tube at about the 5-cm level, suggesting the possibility of a tracheoesophageal fistula. The daily intake of fluid ranged from 170 to 550 ml. The temperature curve was irregular with daily elevations reaching 102.6°F on 15 October. The patient's course progressively worsened, with increasing pulmonary insufficiency. On 16 October the infant died with a temperature of 103°F.

DISCUSSION

Doctor Harris:* I believe that the immediate cause of death in this case was the respiratory infection, more specifically, an aspiration pneumonia. My primary diagnosis is a type IV or "H" type tracheo-esophageal fistula. I shall consider the case from three angles: first, the symptoms attributable to a congenital defect of the esophagus; second, from the standpoint of the anemia; and third, from the standpoint of the skeletal findings.

Certain symptoms attributable to an esophageal defect are provided. These include: (1) excessive mucus following feedings, (2) the statement that the baby would take several swallows and then refuse further feedings, and (3) the physical finding of a malnourished baby. There is also mention of resistance to the passage of the gavage tube.

A consideration of the causes and types of esophageal lesions is in order. First, the tracheoesophageal fistulas will be discussed. The incidence of tracheoesophageal fistula vary from 1 in 500 births in Boston to 1 in 10,000 births in Philadelphia.[1] Ninety-seven per cent of the cases of tracheoesophageal fistulas are associated with atresia. There are four types of tracheoesophageal fistulas. The most common type is the condition in which an upper segment of esophagus ends in a blind pouch at about the level of the bifurcation of the trachea or slightly above, and a lower segment from the stomach is connected

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to the trachea by a short fistulous tract. Much less common is the state in which both upper and lower esophageal segments are blind, neither being connected to air passages. The third type is one in which the upper esophageal segment opens into the trachea and the lower segment is a blind pouch. The rarest type (type IV), accounting for from 1 to 10 per cent and usually reported in about 3 per cent of the cases, is a communication between the intact esophagus and the trachea or bronchus through a small fistulous tract that may be very difficult to demonstrate.

This fourth type is the variety that this patient most likely would have, because if the child had any others with an atresia, death would have occurred sooner. The symptoms of this fourth type of tracheoesophageal fistula, the "H" type, usually include coughing, choking, and cyanosis with the first few feedings. History of these symptoms is not provided; however, there is no denial of that fact in the protocol. The baby usually takes to the nipple eagerly and takes a few swallows and then chokes and may become cyanotic and refuse further feeding so that the infant in time usually becomes malnourished.

In 1955 there was reported from St. Louis, a series of three cases.[2] The patients' ages were 1 month, 6 weeks, and 23 days. Autopsy was performed on two of these; the third received surgical correction and was apparently well following the surgery. However, this does prove that with this fourth type of tracheoesophageal fistula infants can live to this age. In fact, the first patient who was successfully operated on was 6 years old. In 1939 Imperatori[3] described a case of a 6-year-old child in whom pyloric stenosis was suspected, and the baby was operated on without benefit. Throughout infancy and early childhood therapy continued to be directed toward dilatation of the cardia by administration of antispasmodics, sedation and use of mechanical dilators. Chronic pulmonary disease, retarded physical development, and general poor health persisted until the presence of a tracheoesophageal fistula was demonstrated in the sixth year of life. Imperatori then operated on the baby and found a fistula 1.3 cm long between the trachea and esophagus. A plastic closure of the fistula was performed and a permanent cure was obtained, with the return of good health.

Concerning the diagnosis of this type of fistula it must be recognized that the tract may be so small or its course so devious as to impede the passage of contrast media such as Lipiodol. Under certain circumstances an aqueous contrast medium such as a 35 per cent solution of Diodrast is indicated. The treatment indicated is surgical and if the baby dies, which is not uncommon, the cause of death is an aspiration pneumonia. Another possible anomaly consists of a short esophagus. In such a case a portion of the stomach is displaced upward through the diaphragm into the thoracic cavity. The stricture is at the cardia in the midthorax with the short esophagus above it and the free gastric mucosa below it. The rugae can be followed through the diaphragm as a continuation of the rugae of the subdiaphragmatic stomach. The fact

that the cardia becomes stenotic accounts for the symptoms. The clinical picture is characterized by dysphagia, regurgitation, malnutrition, and frequent attacks of complete obstruction of the esophagus. When there is stricture the only treatment is repeated dilatations which are often unsuccessful and one must resort to gastrostomy. Death in childhood is unusual, and if it occurs it usually results from an aspiration pneumonia.

Another possible lesion might be a congenital stenosis of the esophagus, either as a web or as a segmental narrowing of the lumen. This lesion would cause symptoms similar to those of the congenitally short esophagus. However, the symptoms are less severe, less often fatal, and respond more readily to esophageal dilatation than the congenital short esophagus. Another possible lesion could be a congenital vascular ring encircling the trachea and esophagus. In this instance, however, the patient would have symptoms of a croupy cough and laryngeal stridor, as well as symptoms of esophageal compression. The most common type of congenital vascular ring is a persistence of both arches of the aorta with one arch being larger than the other. The ring thus formed encircles the trachea and esophagus. This would cause no disturbances in circulation but would cause definite symptoms of difficulty in swallowing and breathing. However, there should be a croupy cough and laryngeal stridor, which are not recorded in this case. Other anomalies of the large vessels may also produce these vascular rings. A right aortic arch may occur in combination with a left descending aorta. A right aortic arch may be associated with a left subclavian artery arising from the dorsal root of the aorta, compressing the trachea and esophagus. A compression of the esophagus and trachea could be produced by an aberrant right subclavian artery which arises as the last branch of the arch of the aorta. However, any of these vascular rings would produce symptoms of a croupy cough and laryngeal stridor.

In addition to the primary diagnosis the skeletal findings are regarded as associated lesions. Some of the possible diagnoses will be discussed. The diagnosis of chondrodystrophy is usually readily made by inspection. The characteristic skeletal features may be present at birth; however, these manifestations may be incomplete or somewhat atypical. In the latter event roentgenographic examination of the long bones will be diagnostically helpful. The clinical features result from the retardation of endochondral osteogenesis including the epiphysis, while periosteal bone formation continues in a normal fashion. The extremities, especially the thighs and upper arms are characterized by marked shortening and increased width. The normal curvatures are exaggerated. The hands often may not extend much below the waist. Enlargement of the epiphysis may limit extension at the shoulders. The head is relatively large and the forehead and mandible prominent. The bridge of the nose is depressed while the tip is broad and turned up. The medial portion of the clavicle grows normally because of its membranous origin while the lateral portion

which is endochondral in origin, demonstrates impaired growth. This may cause outward and upward buckling of the clavicle. The length of the vertebral column is relatively normal and is the important part in differentiation from Morquio's disease (chondroosteodystrophy). Lordosis, protrusion of the abdomen, and prominent buttocks are other characteristic features. The stature is, of course, lower than normal.

Osteopetrosis, or Albers-Schönberg disease, is a rare disorder characterized by the hardness and brittleness of the bones. The patient often has a hypochromic anemia and in the final stage of the disease a myelophthisic anemia. The roentgenographic appearance of the bones is diagnostic. The cortex of the bones as well as the trabeculae are thickened. The increased density of the entire skeleton is the essential feature. No distinction can be made between the cortex and the marrow. There are heavy shadows at the base of the skull and the bones of the cranial vault appear less dense.

Caffey and Silverman[4] described the condition of infantile cortical hyperostosis, in which hyperostosis has been observed in the calvarium, mandible, clavicles, scapulas, ribs, and the long bones of the extremities, including the metatarsals. The clinical features vary to a considerable degree but as a rule the symptoms are not severe. Fever is usually of low degree. Tenderness, irritability, pseudoparalysis, dysphagia, pleurisy, increased sedimentation rate, and elevated serum phosphatase have been observed in several combinations. The occurrence of the syndrome is limited to the first six months of life. Recovery has occurred in all recorded instances with no residual defects, so it would have to be an incidental diagnosis in this case. A similar clinical picture may occur in infants with vitamin A poisoning. However, the symptoms do not occur until the latter half of the first year of life, and there is no facial or mandibular swelling as in infantile cortical hyperostosis. Caffey[5] also stated that he had never seen a case of scurvy in the first three months of life. Likewise this case is probably too young for rickets. Osteochondritis due to congenital syphilis may occur during the first three months of life. However, in congenital syphilis the liver is almost always enlarged and there is usually some degree of jaundice as well as an enlarged spleen and lymph nodes, mucocutaneous lesions, and skin lesions, all of which are not present in this case.

Now, to consider the patient's anemia. I consider it to represent an anemia of infection. Congenital leukemia is rare but has to be considered. However, the lymph nodes, spleen, liver, and kidneys are usually enlarged. The hemorrhagic tendency is almost universally present and is manifest by petechial purpura and extensive ecchymoses. In 1927, Fanconi[6] reported the course of an aplastic anemia in association with multiple congenital anomalies in three male siblings. These children had hyperpigmentation, macrocephaly, hypergonadism, exaggerated tendon reflexes, and congenital strabismus. In other reported instances there have been anomalies of the heart and geni-

tourinary tract and, most consistently, defects of the bones of the arms and hands. Cleft palate has also been noted. Attention is usually first called to these patients by the presence of anomalies at birth.

The anemia becomes manifest in a few weeks. It is progressive and unrelieved except by transfusion. Ecchymoses and hemorrhage from the mucosal surfaces may occur early and usually recur often. Granulocytopenia renders these children susceptible to frequent and severe intercurrent infection. The treatment is limited to the liberal use of antibiotic drugs and transfusions of whole blood. Few patients survive the early years of childhood. However, in this case anemia is not an aplastic type and there are no hemorrhagic tendencies. No evidence whatsoever exists that this anemia is due to a hemolytic mechanism. So again I feel that the cause of death is aspiration pneumonia and the primary diagnosis is a type IV, or "H" type, tracheoesophageal fistula.

Doctor Butz: Have you explained the bone lesions, and can the entire clinical picture be brought together?

Doctor Harris: No, I haven't. I have to consider the bone lesions as associated findings. I mentioned the diagnoses that include the bone lesions. I tried to think of a process where one diagnosis would explain the whole entity and cannot find any disease that would suffice. Therefore, I thought that this was probably more likely a type IV tracheoesophageal fistula with the bone findings as an associated condition. One condition I considered was that the bone lesions could be associated with scurvy. Of course, Caffey stated that scurvy does not occur this early. This is true if you think of malnutrition as being responsible for scurvy. The protocol does not mention painful extemities which they should be if they were swollen as the result of a subperiosteal hemorrhage.

In talking about these bone lesions one has to think of several more entities. First of all, this is not osteopetrosis or Albers-Schönberg disease which reveals a white, uniform type of sclerosis of all the bones. It originally occurred to me that there are relatively normal looking bone outlines, that outside the cortex there is calcification and, I presume, new bone formation in all the long bones. One must think of trauma here. It is possible that a youngster subjected to head blows or rough handling of the extremities could have such a type of lesion, although most of the time he would also have fractures, but the physical picture is one of subperiosteal hemorrhage and new bone formation in all the bones. I cannot see how this youngster could have such trauma in all extremities.

I think that we do have to try to tie this up into one disease, one entity that produces the anemia and the bone changes, besides the congenital malformations of the fingers and toes. The disease that I think would do all this would be Fanconi's hereditary congenital anemia. I wish that it were a complete anemia, such as a pancytopenia,

rather than a normocytic anemia. This child did have a good elevation of the white count, but to account for all these three features I must diagnose the disease as Fanconi's anemia.

Doctor Schwartz: Doctor Maki, will you discuss the x-ray findings please?

Doctor Maki:* A single anteroposterior view of the skeleton demonstrates that there is marked thickening of the periosteum of the long bones (fig. 1). I think the scapulas also are involved. This appears to be the most significant abnormality. I think that Doctor Harris brought up a very good point in saying that this thickening may be due

Figure 1. Roentgenogram of patient showing extensive deposits of of subperiosteal new bone on long bones of extremities.

to trauma. In the time I have been here, I have seen two cases of trauma in which there was marked periosteal thickening of the extremities on both sides, but not the degree of extensive and symmetrical involvement present here. A differential point in Fanconi's disease, in which there

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is extensive kidney damage as well, is the presence of osteoporosis. Some of the other diseases to consider, of course, would be scurvy and rickets, both of which would also demonstrate osteoporosis. In rickets the changes are predominantly in the growth cells at the ends of the bones and here, especially at the distal ends of the tibia, a fair state of normal ossification is apparent. There isn't any osteoporosis, saucerization, widening, or any of the other features which are present in rickets, and the same holds true for scurvy. With scurvy there would be more ballooning of the periosteum. In this case the changes are symmetrical on both sides.

Infection, perhaps, should be considered but can be excluded almost immediately. It is most unusual to have such extensive involvement resulting from either tuberculosis or osteomyelitis. Certainly if there was involvement in only one bone, infection should be considered. With tuberculosis the changes are mostly those of destruction which may be localized. In the latter instance, the only location in which there is thickening of the bone or periosteum is in the metacarpals and phalanges or the metatarsals.

Osteopetrosis or "marble bone" can be excluded because in this condition there is a homogeneous appearance of the bone whereas in this case the cortex and the marrow are actually visible beneath the periosteal thickening. This is not true with "marble bone disease." Von Englemann's disease is another condition to consider, but this is usually discovered at a later date, at about 8, 9, or 10 years of age, and again there is symmetrical thickening of the diaphyses. In addition, the nutrient foramina are enlarged and pronounced.

Hypervitaminosis A, as Doctor Harris has mentioned, is not likely because it is not usually seen before the age of one and in that condition there isn't as much periosteal thickening and it is usually more symmetrical.

Caffey's disease probably explains all the findings in view of the fact that in Caffey's disease there is involvement of the scapulas, symmetrical periosteal thickening of the long bones, and the mandible is involved in almost all cases. The age group is right. Last spring (1955), Doctor Caffey was in Seattle, Wash., and presented a paper on this disease. In a number of cases he was actually able to make the diagnosis in utero when the patients presented themselves for pelvimetry studies. I think the findings here probably would fit those of Caffey's disease.

A Physician: Can you rule out syphilis?

Doctor Maki: In congenital syphilis the changes are found in the ends of the long bones. The tibias may show periosteal thickening and osseous destruction may be present in their proximal ends. This is called Wimberly's sign.

A Physician: Doctor Maki, does not this sign appear a little later in life? This is a young child.

Doctor Maki: This is true with respect to the thickening of the tibia. That is a later sign, but other signs are found early. Periosteal thickening is usually confined to the tibia on the convex side.

A Physician: What is Caffey's disease?

Doctor Maki: Nobody knows. The other name is infantile hyperostosis corticalis. It is of unknown etiology and as Doctor Harris mentioned it is a self-limiting disease. Patients become perfectly normal after 6 months or a year of life.

Doctor Pophal:* Any other comments?

Doctor Tomsovic:** This baby was born with multiple congenital anomalies. The child had difficulty in swallowing and maintaining its nutrition from the time it was born, which suggests the existence of yet another congenital anomaly. To go back a step further, the cause of the congenital anomalies may have been something which occurred during the course of the pregnancy. There may have been a nutritional injury to the fetus. If the mother's nutrition is poor, the baby may be born with congenital anomalies and may begin life with a poor nutritional endowment. If the mother had a poor diet the infant might have had to start life with a relatively poor store of iron (this may have had bearing on the anemia). Likewise the child might have had a relatively low store of vitamin C which, coupled with a deficit present at birth, could lead to clinical scurvy before the usual age of onset. The periostitis requires a separate explanation since it does not fit the rest of the picture of multiple congenital anomalies.

Now let us consider Fanconi's syndrome. There are two syndromes bearing Fanconi's name. One is a metabolic error producing aminoaciduria, glycosuria, and the kidney changes which have been described. The second Fanconi syndrome is the one referred to in this case. This is characterized by congenital anomalies in the hands and forearms, particularly absent thumbs, pigmentation involving genitalia and axillas, and a severe anemia which is quite refractory to treatment. This, I believe, is the principal diagnosis.

I do not believe that the story is consistent with tracheoesophageal fistula. There are types of tracheoesophageal fistulas that produce trouble immediately after the baby is born and there are types in which the infants progress satisfactorily for a period of time. Almost all of the latter, which appear by 2 months of age, show evidence of pulmonary aspiration. The esophageal obstruction seems to me, therefore, to be due to some other type of abnormality, most likely a vascular ring.

I would diagnose this as a case of Fanconi's syndrome with congenital hypoplastic anemia, with an obstructive lesion of the esoph-

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**Maj. Edward R. Tomsovic, MC, USA, Chief Pediatrics Service, Department Medicine.

agus, most likely a vascular ring, with scurvy secondary to nutritional deprivation.

A Physician: How can one differentiate between the two types of Fanconi's syndrome?

Doctor Tomsovic: I think it would be hard to make a diagnosis of Fanconi's syndrome, the type with anemia, in an infant of 9 weeks. It is only after following the patient with repeated blood counts and demonstrating a consistently low hemoglobin without other apparent cause that the diagnosis usually becomes evident. I think it would be almost impossible to make a diagnosis of Fanconi's syndrome with certainty in such a young infant. The other Fanconi's syndrome, so-called de Toni-Fanconi syndrome, is excluded clinically by negative urinary findings.

Doctor Harris' Diagnoses:

1. Tracheoesophageal fistula, type IV
2. Fanconi's syndrome
3. Pneumonitis, bilateral aspiration type

Doctor Tomsovic's Diagnoses:

1. Fanconi's syndrome with congenital hypoplastic anemia
2. Esophageal obstruction due to a vascular ring
3. Scurvy secondary to nutritional deprivation

Doctor Maki's Diagnosis:

1. Infantile cortical hyperostosis (Caffey's Disease)

PATHOLOGIC FINDINGS

Doctor Pophal: This is a case of Caffey's disease. The immediate cause of death was severe bilateral bronchopneumonia. A tracheoesophageal fistula was not present; however, there was a distinct narrowing in the first portion of the esophagus and although it was not mentioned in the history, I feel that aspiration due to the stricture may have played some part in bringing about a pneumonitis in this child. The anemia was probably secondary to inadequate nutrition resulting from this stricture and also due to infection. The anomalies of the hands and feet (arthrogryposis multiplex congenita) were incidental to the death of this infant, because as it has been stated, most of these infants recover spontaneously.

Most cases of Caffey's disease occur before the age of 4 months, although there is at least one case that began at 20 months. There is no sex preference. Most patients are Caucasians although one reported was a Negro and one a Chinese. The family history is not contributory. In at least one instance there was reported more than one case in a family, but not at the same time. Most cases first become manifest with irritability, usually associated with fever, and some time thereafter swelling develops, most often noted in the long bones. In a short time, bone deposits are laid down in the areas of swelling. Some of these deposits are so small that they cannot be

palpated, and in other areas the enlargement and bone formation is so extensive as to produce a gross enlargement. The swellings have been reported in all parts of the skeleton except the phalanges, small bones of the carpus and tarsus, vertebrae, and pelvis. Associated findings include anemia, leukocytosis, elevated sedimentation rate, fever, and pleurisy. In some cases it was believed that the pleurisy was associated with changes in the ribs adjacent to the pleura, but pleurisy has also occurred in cases without involvement of adjacent ribs, so it is not a constant feature. The skeletal pathology involves a severe thickening of the periosteum with a gelatinous character and dense fibrous bands extending from the periosteum into the adjoining tissue. Some observers have stated that these fibrous bands even extend to the skin. The periosteum is edematous and vascular, but there is no inflammatory infiltration or hemorrhage. Then there is extensive formation of subperiosteal bone which is unorganized and is extremely vascular. The marrow spaces are fibrous. The cells of the marrow have been described as lymphocytoid cells or cells resembling micromyeloblasts. This disease is characterized by exacerbations and remissions, and with these exacerbations and remissions additional layers of cortical bone are laid down. The muscles adjacent to the bone show degenerative changes and the arteries reveal intimal proliferation, such that some observers have wondered if this disease begins in the soft tissues rather than in the bone. The original cortex is well preserved for a time but as the process progresses, thinning of the cortex is observed, there being a widening of the medullary cavity, with regression and osteoporosis but eventually the bone returns to normal.[7]

The typical appearance of these infants, described as a "moon face," is the result of thickening of the bones of the skull, particularly the mandible. The original cortex is relatively undisturbed. This section through the knee joint reveals that the cortical hyperostosis does not extend beyond the epiphyseal line (fig. 2). Some of these children have distinct limitation of motion of the joints and in this patient there were adhesions between the synovia and joint surface.

The periosteum is edematous, greatly thickened, and cellular. There is no leukocytic infiltration or hemorrhage to indicate an inflammatory process (fig. 3).

A higher magnification of the subperiosteal new bone shows extensive osteoblastic activity, and yet there are a surprising number of osteoclasts in some areas. No Haversian systems are noted. The bone is unorganized. The marrow substance is cellular, slightly fibrotic and very vascular (fig. 4).

In a section taken at the epiphyseal junction (fig. 5) there is disorderly growth and the epiphysis is wide. The etiology of this condition is unknown. Many factors have been considered—infection, allergy, excess of vitamin A, et cetera—and many tests have been made. These lesions have been cultured, not only for bacteria but also for viruses

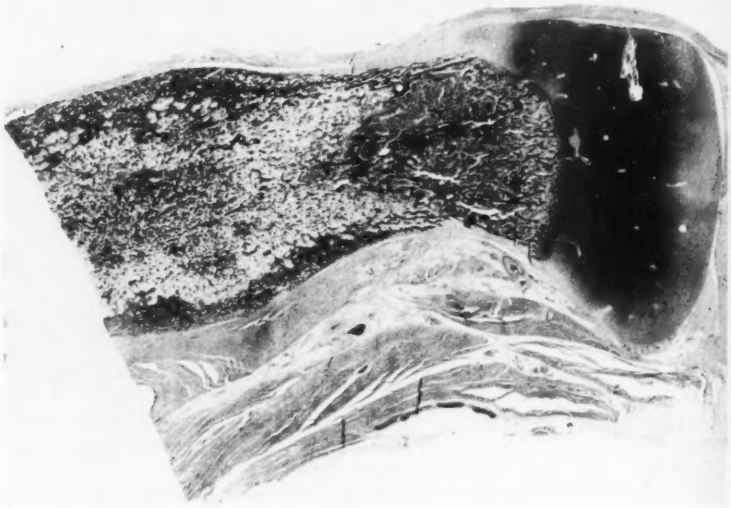

Figure 2. Section of distal end of femur showing subperiosteal new bone formation. There is no involvement beyond the epiphyseal line.

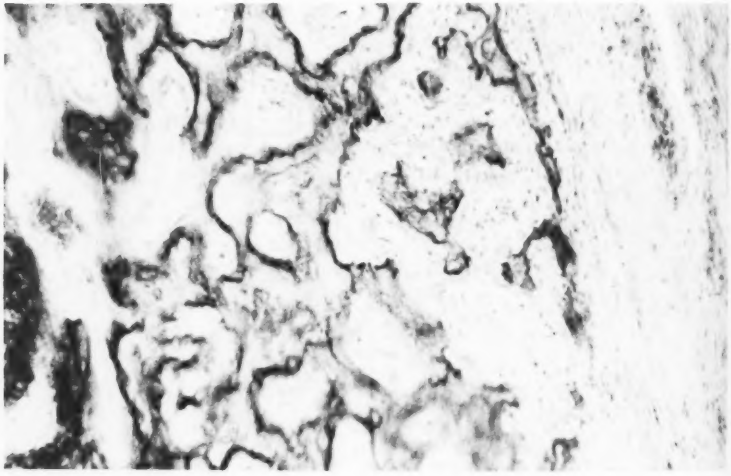

Figure 3. Photomicrograph of periosteum showing marked cellular thickening but no evidence of hemorrhage or active inflammation.

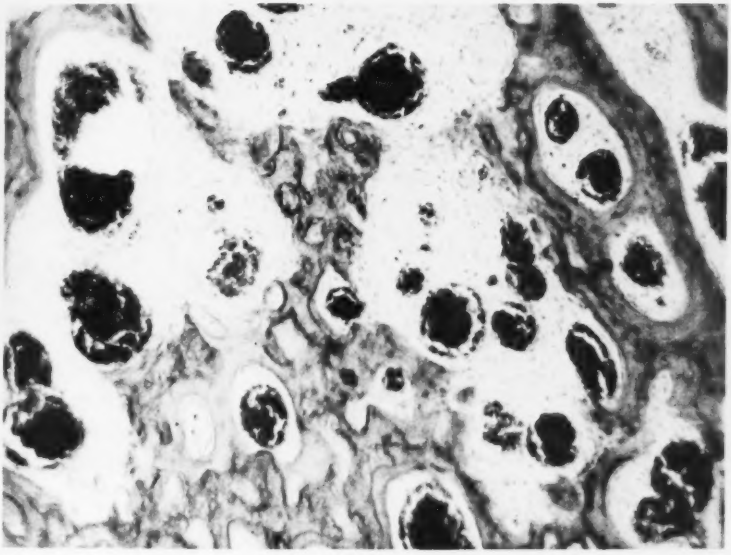

Figure 4. Photomicrograph of new immature bone. The trabeculae are unorganized and the marrow spaces contain vascular fibrous tissue.

Figure 5. Photomicrograph of epiphysis revealing disorderly growth of cell columns.

and they have been negative. Tests for typhoid, paratyphoid, brucellosis, and various other conditions have been negative. Various types of treatment have been tried but to date none have been helpful. Most cases recover spontaneously.

Pathologic Diagnoses:

1. Bronchopneumonia, bilateral
2. Congenital esophageal stenosis, first portion
3. Infantile cortical hyperostosis (Caffey's disease)
4. Arthrogryposis multiplex congenita

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THE CHANGING PATIENT

"Medicine is still a private art. The physician's confidential patient approach is the same as ever. The change is mainly in the patient. He may not have the faintest idea of the functional relationships within his glandular system, but at least he is aware and can cooperate with the physician in his treatment. Even if he doesn't understand the *Reader's Digest* article, he has an interest which must be put to good use. To him, or her, medical news may only be an abstraction or gossip, but the physician—and the physician alone—has an opportunity to convert it into a promise or hope come true."

—HENRY S. McNEIL
in *Journal of South Carolina Medical Association*
p. 260, July 1957

NUTRITION SURVEYS IN THE NEAR AND FAR EAST

Report of the Interdepartmental Committee on Nutrition for National Defense

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THE enthusiastic and continued interest in nutrition improvement shown by the six countries in the Near and Far East where the Interdepartmental Committee on Nutrition for National Defense (ICNND) has conducted surveys during the past two years is evidence that this form of technical assistance is well accepted. During our visits to the Near East in the fall of 1956 and 1957, people repeatedly expressed thanks—and sometimes surprise—that the United States is interested in the welfare of men in other nations—in their health and their food. In most of the developing countries visited, the primary concern of the majority of the people is survival, which is dependent on food and shelter. These seem far more important to them than the possibility of war and destruction.

The work of the nutrition teams is carried out on a partnership basis, with scientists and technicians of the host country working with the United States members. The latter have reported that the nutrition studies are an effective form of scientific-military aid which often can be expanded and applied for improving the health of the civilians. The success of this type of mutual assistance is due in large part to the understanding, co-operation, and wholehearted support received from host country governments and military groups, U. S. Government agencies, and Military and Economic Assistance Missions.

Much credit is due our armed services, the U. S. Public Health Service, and the many universities and colleges that have released key personnel for the survey teams. The following educational institutions have participated: Vanderbilt, Cornell, Illinois, Maryland, Harvard, Rochester, Tulane, Temple, Agricultural and Mechanical College of Texas, Oregon State, Pennsylvania State,

From Office of the Assistant Secretary of Defense (Health and Medical), Department of Defense, Washington 25, D. C., and the National Institutes of Health, Bethesda, Md.

and Virginia Polytechnic Institute. The U. S. Army Medical Nutrition Laboratory, the National Institutes of Health, and the Office of the Surgeon General of the Army also have supplied personnel, while laboratory support has been obtained from the Naval Medical Research Unit No. 3 in Egypt and the 406th Medical General Laboratory in Japan.

We all are familiar with the role that food, nutrition, and health play both in a military operation and in daily life. The old saying that "An Army marches on its stomach" has not changed today. We may have atomic power to propel ships and generate electric power, but no such concentrated substitute for supplying man with energy has been developed. Calories for human propulsion and warmth are still derived from fats, proteins, and carbohydrates. Fuel and hardware are logistic problems, but food is a problem both of logistics and of health.

Sufficient data have been accumulated to state unequivocally that military equipment aid is a poor investment unless the personnel are physically capable of utilizing it with maximum effectiveness. This is not possible when the performance of some 50 per cent of the personnel is impaired by nutritional deficiencies, when training hours must be curtailed due to physical exhaustion, and when lack of a field-type ration reduces effective mobility regardless of the degree of mechanization of the armed forces.

During the past few years our Government has recognized the importance of food and nutrition as an integral part of the Mutual Defense Assistance Program of technical, military, and economic aid. At the close of World War II, the nutritionists of the United States and its allies were called upon to assist in Europe in diagnosing and recommending measures to alleviate problems of acute starvation associated with a secondary protein deficiency.

In Asia and Africa the nutritional problems are much more complex and their solution more difficult. To begin with, in sharp contrast to the large background of data available on Europeans, these is little factual information available on the nutritional conditions and requirements, food production, habits, customs, and taboos of many Asiatic populations. The countries included in the present program are keenly aware of the seriousness of their feeding and nutritional problems and have indicated a desire for assistance.

FORMATION AND FUNCTIONS OF THE ICNND

The Committee was organized as the result of a study of the Korean Army and of our efforts to assist the Chinese Nationalists on Taiwan in 1953-1954. One of the findings was that much of the data in reference to food and nutrition which had been collected previously was not generally available to the groups having operating responsibilities in this area. No less than six

different groups were independently making studies in Taiwan. A co-ordination of these studies was indicated to effect economy and to consolidate the recommendations.

In July 1954 an ad hoc co-ordinating committee on nutrition problems was organized at the National Institutes of Health, Bethesda, Md., under the sponsorship of the Department of Defense, with representatives of the departments and agencies with interest in and operating responsibilities for the Mutual Defense Assistance Program. The ICNND was formally established early in 1955 by a memorandum of agreement signed by the Secretaries and heads of departments of interested agencies (Departments of Defense—Army, Navy, Air Force—State; Health, Education and Welfare; and Agriculture; plus the International Cooperation Administration.) It was later expanded to include the Atomic Energy Commission. Membership includes representatives from the above agencies.

The Committee has a Secretariat consisting of an Executive Director, a nutritionist, a clinician, and an agricultural economist, with offices at the National Institutes of Health. The late Dr. Harold R. Sandstead served as the first Executive Director until his untimely death in November 1955. A panel of 20 consultants who are specialists in the fields of nutrition, medicine, biochemistry, food technology, and agriculture serves as an advisory body, and four subcommittees of consultants have been appointed to consider standard methods for nutrition surveys, nutritional requirements and working standards, nutrition research programs for foreign countries, and food and agriculture.

The purpose of the Committee is to deal with nutrition problems of technical, military, and economic importance in foreign countries in which the United States has a special interest. The Committee serves as a central clearing house on food and nutrition information, evaluates problems of food procurement and feeding, prepares reports and recommendations for the agencies concerned, reviews nutrition projects being conducted in areas where the United States is giving assistance, and co-ordinates, advises, and participates in field projects, when appropriate.

NUTRITION SURVEY PROGRAM

In April 1955 and in November 1956, representatives of the ICNND visited a number of countries in Asia and Africa. Following these visits the Committee received requests from the governments of Iran, Pakistan, the Philippines, Turkey, Korea, and Libya for nutrition surveys of their armed forces. The first surveys were begun in January 1956 in Iran and Pakistan, and surveys now have been completed in all six countries. Funding was arranged through the Assistant Secretary of Defense for International Security Affairs as part of the Mutual Defense Assistance

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Program, the cost to the United States averaging only about $53,000 per country surveyed.

Objectives. The objectives of the nutrition surveys can best be summarized by three words: *assess, assist,* and *learn.* The assessment phase involves an evaluation of the nutritional status of the population, and the capabilities and potential for improving the health of the people. In conjunction with the surveys, immediate assistance is given as follows: (1) by training host country personnel in nutrition evaluation technics, emphasizing clinical and biochemical phases and dietary intake and food production studies; (2) by furnishing essential laboratory equipment and supplies for establishing a permanent medical nutrition and food laboratory; and (3) by defining the major nutrition problems and developing practical recommendations so that the host country can best utilize the resources within the country.

The surveys afford an excellent opportunity for United States personnel to learn much from these countries regarding nutritional diseases, foods and food habits, and customs and practices. Also, the clinical, biochemical, and dietary data obtained contribute to a better understanding of nutritional diseases.

Implementation. Upon request for assistance from a country under the Mutual Defense Assistance Program, the ICNND organizes a nutrition team by appointing specialists in the fields of medicine, nutrition, food technology, agriculture, and sanitation. For most surveys the United States nutrition team members include a survey director, one or two clinicians, three biochemists, two food and dietary survey specialists (usually former U. S. Army nutrition officers), a food technologist and agricultural economist, and a sanitary engineer. The host country furnishes counterpart personnel, laboratory space, and other logistical support. About 70 to 90 days are required to make a survey.

Procedures. A *Manual for Nutrition Surveys* has been prepared to serve as a detailed guide for conducting surveys, and a revised edition, incorporating the experiences of the first four field studies, is in press at the U. S. Government Printing Office. The primary purposes of the *Manual* are: (1) to establish uniformity in methods, technics and procedures, so that a reliable comparison may be made of results of surveys within and among countries; (2) to serve as a reference to ensure maximum coverage of the major facts considered essential in appraising nutritional status to permit practical, effective recommendations; and (3) to define the responsibilities and duties of various team members.

The clinical team conducts a physical examination on a statistical sample, the number being determined by the population size. In general, about 2,000 persons are given a detailed examination, and an additional 3,000 to 5,000 are given abbreviated physical

examinations that are limited to selected major signs of nutritional significance.

Samples of urine and blood are obtained from about 500 of the subjects receiving a complete physical. The biochemical analyses include determination of hemoglobin; hematocrit; plasma protein, vitamin C, carotene, and vitamin A; and urinary excretion of thiamine, riboflavin, and N^1-methylnicotinamide. The biochemical team is equipped to determine total serum cholesterol and serum albumin and globulin, and to conduct vitamin saturation tests if findings so dictate.

The food and dietary team determines daily food intake by inventory and food preparation survey technics, and collects composite food samples for chemical analysis. In addition, data are collected on food issues, menu planning, and food habits. The agricultural economist and food technologist surveys food production, preparation, processing, storage, and transportation.

HIGHLIGHTS OF SURVEY FINDINGS

General Observations. Although there are many similarities in the food and nutrition problems in the countries surveyed, each country must be considered separately and practical recommendations made for the solution of individual problems. Two factors affecting the nutritional status of developing countries are: lack of adequate transportation to move food from the area of origin to other parts of the country where these foods are in short supply; and lack of processed foods, resulting in considerable quantitative and qualitative fluctuation of food intake during different parts of the year. This lack of processed foods also curtails efforts to develop a field-type ration.

Cooking facilities in most of the kitchens consist primarily of large round-bottomed pots, either iron or tinned copper, often mounted over a dried clay firebox. Most kitchens prepare food for battalion-size units, and the meals are of the one-pot type, which is a stew or a soup. This is supplemented with bread in the wheat-eating countries, or a side dish of rice in the rice-eating areas. Typical kitchens are shown in figures 1-3.

Other kitchen equipment usually is very meager, consisting primarily of stirring equipment, pails, knives, and a miscellaneous collection of containers. In most cases there are no mess halls, and each unit brings a large container to the kitchen where a measured amount of the food, depending upon troop strength, is issued. This is taken to the barracks, where the individual issue is made.

As one would expect, cooking facilities are less adequate with smaller units at outlying posts. In general, it is in these units that nutrition problems are most exaggerated. Most foods

are procured from local contractors, and in many cases fresh vegetables are purchased by individual units. Since refrigeration and preserved foods are extremely limited, virtually all perishables are issued on a 24-hour basis.

Figure. 1. Typical "one-pot" system of cookery used in Iran and many neighboring countries.

Figure 2. Korean military field kitchen under canvas. The stove can be reconstructed quickly at a new location.

Figure 3. More permanent type of Korean military field kitchen, with walls and thatched roof.

Improvement of health and sanitary conditions is dependent largely upon active participation and direction by the Command. In nearly all armed forces, this authority has been delegated. However, preventive medicine, which includes sanitation, housing, feeding, and disease control, is of necessity a Command function.

In most of the countries there is need for improvement in the basic ration allowance and in menu planning, with consideration given to the nutritional adequacy as well as to the cost of a ration.

In general, the principal nutritional deficiencies encountered in the countries surveyed were of riboflavin, thiamine, vitamin A, and vitamin C. Not every country has problems involving all of these vitamins, and in most cases, not all the areas within a country have such problems. Suboptimal intakes of these essential nutrients can, when sufficiently aggravated, result in serious physical disability of the troops. A man with scurvy, beriberi, or night blindness becomes a hospital patient and not an effective soldier.

General Recommendations. The teams recommend that a nutrition service be established, with representation from the medical, veterinary, and quartermaster departments, and that this group establish close working relationships with civilian experts in the fields of nutrition, agriculture, food technology, transportation, and storage. Some of the principal duties of this service would be to assist Command in (1) formulating basic ration allowances

and master menus for all the services, to ensure nutritional adequacy of all the essential nutrients; (2) developing and maintaining a list of food substitutes that could be used as a guide at the ration purchase and distribution points; (3) formulating and testing emergency field-type rations to be used in the field and, in some cases, at outlying posts; and (4) determining the nutritional status of the troops at periodic intervals.

In a few instances, food wastage presented a serious problem. Much of this resulted from overissue of certain foods that the troops did not like, or poor food preparation and, occasionally, poor quality of the food purchased. Where it did occur, the nutrition service gave invaluable help in correcting the situation.

In nearly all cases the nutrition problems encountered could be corrected by proper utilization of the resources within the country concerned.

Principal Nutrition Problems. A summary of the major clinical, biochemical, and dietary findings is given in table 1. With a few exceptions, there is a good correlation between these three phases of the nutritional assessment.

TABLE 1. *The major clinical, biochemical, and dietary findings in surveys of armed forces personnel of six countries in the Near and Far East*

	Korea	Iran	Pakistan	Philippines	Turkey	Libya
Riboflavin nutriture						
Clinical examinations (number)	1514	1730	2019	4234	8519	1749
Biochemical determinations (number)	303	396	440	454	329	144
With angular lesions (per cent)	13	15	0.6	0.8	23	5
With angular scars (per cent)	11	21	0.1	72	17	4
With urinary excretion < 30 μg/6 hr (per cent)	16	21	3	7	5*	4
Average dietary intake (mg/day)	1	1.1	1.2	0.8	1.1	1.1
Thiamine nutriture						
With loss of ankle jerks (per cent)	0.1	1.3	0	3	1.3	1
With urinary excretion < 25 μg/6 hr (per cent)	5	9	6	41	4	44
Average dietary intake (mg/day)	2.1	2.8	2.6	1.1	3.1	0.7
Vitamin C nutriture						
Clinical examinations (number)	1514	1730	2019	4234	8519	1749
Biochemical determinations (number)	303	396	440	454	329	144
With scorbutic type gums (per cent)	0.3	1.6	0	0.3	5.8	0.1
With bleeding gums (per cent)	0.4	13	6	0.1	10	8
With serum vitamin C < 0.2 mg/100 ml (per cent)	1	51	44	17	73	74
Average dietary intake (mg/day)	55	22	60	39	15	23
Vitamin A nutriture						
With follicular keratosis (per cent)	5	30	29	3	21	2
With serum vitamin A < 20 μg/100 ml (per cent)	18	24	0.6	0.3	9	14
With serum carotene < 40 μg/100 ml (per cent)	7	58	11	12	25	0
Average dietary intake (I.U./day)	1218	3766**	3790	3391	1510	2291

*An additional 9 per cent excreted < 40 μg/6 hr, and 39 per cent < 60 μg/6 hr.
** Range for areas 405 to 4867.

Riboflavin. The most universal problem encountered and the most difficult one to correct by utilizing native foods was that involving riboflavin. The average dietary intake of riboflavin varied from 0.8 to 1.2 mg per man per day. In three countries (Korea, Iran, and Turkey) low dietary intake was accompanied by low urinary excretion of riboflavin and a high incidence of angular lesions.

In both the Philippines and Libya, it was surprising in view of the dietary intake data that the incidence of clinical indicator lesions of ariboflavinosis was very low. In reviewing the data, however, other factors must be considered, for in both countries the dietary intake of thiamine was about 30 to 50 per cent of that in the other four countries surveyed. If data from experimental animals can be applied to man, the observed urinary excretion of riboflavin may have been disproportionately high, inasmuch as it has been shown that chronic thiamine deficiency in rats tends to increase excretion of riboflavin. Regardless of the physiologic result or adaptation, the riboflavin intake must be considered deficient according to present-day knowledge.

Thiamine. Two of the countries surveyed (Korea and the Philippines) are primarily rice-eating populations. The observations shown in table 1 indicate a marked difference in the thiamine nutriture of the population groups studied in these two countries.

In the Philippines highly polished rice, which greatly lowers the dietary thiamine intake, is used. Although there is provision for rice enrichment in the Philippines, only a small part of the rice purchased by the armed forces in enriched. In one area where enriched rice was used, the average dietary intake of thiamine was about 0.3 mg greater than in areas where unenriched rice was used, and the percentage of troops excreting low levels of thiamine was greatly reduced (from 29.5 per cent to 7.9 per cent). In Korea, the armed forces use only undermilled government rice, with a thiamine content of about 0.25 mg per 100 grams. However, most rice for civilian consumption is polished, with a thiamine content of only 0.18 mg per 100 grams.

Vitamin C. In general, the vitamin C status of the personnel examined varied greatly within the countries surveyed. In one area of Turkey, 40 per cent of the troops had blood serum vitamin C levels of less than 0.1 mg, in another area, only 2 per cent of the troops had correspondingly low levels. In four of the countries, a large percentage of those examined had low levels of serum vitamin C and dietary intakes were as low as 15 mg per man per day, although no cases of overt scurvy were noted. In some areas, however, the high incidence of scorbutic-type gums left little doubt that lack of vitamin C is a serious problem.

Vitamin A. There was a great variation in vitamin A intake within each country. In Iran the average intake was about 3,700 I. U., but with a range of from 400 to 5,000 I. U. per man per day. It is realized that dietary intake figures based on a relatively short period do not truly represent the vitamin A nutritional status of the individual, because vitamin A can be stored in the body for considerable periods of time. In most of these countries there are periods of fairly abundant supplies of vitamin A from leafy

vegetables, followed by periods of short supply in the nonvegetable growing season.

ACCOMPLISHMENTS

It has been highly encouraging to note that following completion of the initial survey the countries have continued to carry out nutrition studies and have formulated and implemented practical recommendations that their own resources will enable them to carry out not just as an interim, but as a basic program. Evaluation of improvement in the nutrition and health of a population is difficult. It usually is not of the dramatic type where the value can be determined immediately. Final evaluation of a nutrition program can only be made by measuring progress over the ensuing years, noting the general improvement in the health and vitality of the people and in the over-all productivity.

Korea. One of the first opportunities to evaluate the benefit derived from a nutrition survey came in 1956 when President Syngman Rhee invited the ICNND to conduct a resurvey of the armed forces of the Republic of Korea. The initial survey had been conducted in 1953 under the auspices of the U. S. Army, Office of the Surgeon General, by a team headed by Dr. Harold R. Sandstead.

The dramatic improvement in the nutritional status of the Korean soldier as noted on resurvey is illustrated by some typical data given in table 2. The inductee of 1956 was virtually indistinguishable from the inductee of 1953, with the exception of a better vitamin C nutriture. However, there was a vast im-

TABLE 2. *Improvement in nutritional status of Korean recruits in 1956 as compared with 1953. All figures given represent percentages of total number of armed forces personnel examined*

	1953		1956	
	Raw recruits	After 16 weeks' training	Raw recruits	After 16 weeks' training
Caloric status				
Below 90 per cent standard weight	27.0	46.0	29.0	26.0
90-110 per cent standard weight	72.0	53.0	71.0	67.0
Protein				
Leg edema	0.2	6.0	-	-
Serum protein < 6 grams	-	11.0	-	-
Thiamine				
Calf tenderness	4.0	4.0	-	-
Vitamin C				
Scorbutic gums	21.0	46.0	-	0.6
Serum vitamin C < 0.2 mg/100 ml	60.0	100.0	3.0	-
Vitamin A				
Follicular keratosis	3.0	13.0	5.0	4.0
Serum vitamin A < 20 μg/100 ml	-	17.0	-	-

provement in the nutritional status of the recruits after 16 weeks of training. It also was noted in 1956 that the longer the individual remained in service, the better his nutritional status became. These improvements were due, in considerable part, to the efforts of the Republic of Korea and the United States advisory personnel to carry out recommendations made following the 1953 survey.

As a result of the 1956 survey, it was decided that the refined wheat flour now provided by the United States will be enriched with 3.0 mg instead of 1.2 mg of riboflavin per pound. At the present rate of flour consumption in Korea, this will provide an increase of about 0.25 mg of riboflavin per man per day, at an additional cost of less than $500 per 100,000 men per year.

An example of Korean ingenuity in developing a practical mess gear adapted to their type of foods is shown in figure 4.

Figure 4. New mess gear developed by the Koreans for their army.

Iran and Pakistan. The accomplishments of the nutrition teams to Iran and Pakistan in January to April 1956 have borne results far beyond expectations. Both governments, as expressed through their departments of defense, are extremely grateful for the nutrition studies and the assistance of our Military Assistance Advisory Groups. Nutrition services have been established and are carrying out the recommendations of the teams to improve the nutritional status of their troops. Since the departure of the United States nutrition survey team, the Iranian team has conducted a thorough appraisal of the troops located in the Khash area, and additional surveys are under way. Iran also has rehabilitated a meat and vegetable canning factory and has plans

under way for a second food cannery. This has made possible the development and production of a canned, stew-type field ration.

A quotation from the Health Director, United States Operations Mission, Pakistan, in the March 1956 issue of the *International Cooperation Administration Health Advisor,* is noteworthy:

> The entire program has benefited from the presence of an outstanding team of nutritionists furnished by the U. S. Interdepartmental Committee on Nutrition for National Defense. As a superbly organized action team doing large-scale survey work with the Pakistan Armed Forces in several parts of the country, they have been able to re-awaken interest in nutrition problems at all levels. By devoting long hours to intensive laboratory work and arranging discussions with key civilian and military officials in government, they have discovered several well-qualified Pakistani biochemists and laboratory workers, some of whom eventually may form the nucleus for an effective national nutrition program.

Internation Nutrition Committee. As a result of contacts made by the United States nutrition survey teams in Iran and Pakistan, the Iranian government invited members of the Baghdad Pact to a general nutrition conference in Tehran in November 1956. The conference was attended by representatives of the Armed Forces of Iraq, Pakistan, Turkey, the United Kingdom, and the United States. The delegates passed a resolution recommending that an Internation Committee on Nutrition be organized on a permanent basis, with meetings to be held annually to discuss mutual nutrition problems. They requested the ICNND to serve as the secretariat for the first year of operation.

The United States Government, through the Departments of State and Defense, has authorized United States participation in the Internation Committee, and the governments of Iran, Pakistan, and Turkey have officially approved its formation. Plans recently were completed to hold the second meeting of the Committee in Turkey on 7-9 April 1958.

The hospitality of the Iranians, their sincere friendship, and the active participation of all delegates at the conference left a very favorable and lasting impression. This opportunity for discussing mutual nutrition problems, exchanging ideas, and learning of new technics set a precedent for later meetings of this type.

Turkey. Although the nutrition survey was completed only a few months ago, it already is evident that the Turkish team members were of a high professional caliber and exceedingly well trained to continue an active and progressive nutrition program in Turkey. Within a few weeks after the United States team members had departed, the Turkish nutrition team conducted an addi-

tional survey of another area. They forwarded to the Committee detailed findings covering the clinical examinations, laboratory findings, and dietary and ration studies. Their reports show that their team is highly competent, not only in assessing the nutritional status, but also in formulating practical recommendations for improvement.

The preliminary report of the joint nutrition survey was reviewed with the Turkish survey team in October 1957. They had arrived at conclusions and recommendations similar to those of the United States team, and were actively investigating procedures and means for enriching wheat flour with riboflavin and increasing the fortification of margarine with vitamin A from the usual 400 to 500 I. U. per 100 grams to 8,000 I. U., with establishment of Government specifications and controls to ensure such a level.

The laboratory equipment and supplies furnished by the United States are being used not only in support of nutrition surveys but also in furthering basic research on the effect of nutrition in reference to diseases and parasitic infestations. A comprehensive study is under way of the vitamin content of some of the principal foods, especially as concerns vitamin A, vitamin C, and riboflavin. The possibility of using locally prepared rose cake as a source of vitamin C is under study. (This is a product made from rosebuds that was used extensively by the German submarine forces in World War II.)

Republic of China (Taiwan). A report on "Rice Enrichment in Taiwan" was prepared by the ICNND and distributed to interested agencies, to implement the major recommendations for rice enrichment[1] that were made as a result of the nutrition survey of the armed forces of the Republic of China, conducted by the Office of the Surgeon General, U. S. Army, in the fall of 1954. This involved the establishment of two rice-enrichment, (Premix) plants in Taiwan. These plants were purchased recently and will be in operation in the summer of 1958.

In this method of enrichment, 1 part of rice Premix, which contains supplemental thiamine, riboflavin, niacin, and iron, is added to 199 parts of rice at the local mills, where feeders meter the Premix into the stream of polished rice. The additional cost of rice enriched by this method is less than one tenth of a cent per man per day.

As an interim method, the Committee suggested and assisted in planning a test in Taiwan of a new means of rice enrichment, using an enrichment wafer that is added to the rice during cooking. Since the method of cooking rice in Taiwan does not involve the use of excess water, the loss of soluble nutrients is negligible. Also, the recipe and equipment for preparing rice are

uniform; about 20 kilograms of rice are prepared in one pot. Each wafer contains 40 mg of thiamine, 120 mg of riboflavin, 600 mg of niacin, and 400 mg of iron, which enriches the rice at a level similar to that to be attained by the Premix procedure. The cost of the wafer method is approximately $0.22 per man per year. A test completed in December 1955 indicated that the wafer method of enriching rice was practical in Taiwan, and to avoid delay in improving the nutrition, this method was implemented in 1956.

Use of enrichment wafers has the disadvantage of requiring close supervision, stringent control, and co-operation by the mess personnel in the proper issue and utilization of wafers. Enrichment of rice is accomplished in thousands of mess halls, whereas with the Premix method control points number only about 100. Also, the wafer method is particularly suited for use only under normal messing conditions where standard batch quantities of rice are prepared.

Goodwill Engendered. Along with surveys that amalgamate scientific effort in numerous countries for the betterment of health and welfare, many intangible benefits accrue, although the mental and political responses as concerns goodwill, friendship, and better understanding are much more difficult than the physical benefits to evaluate. The creation of good will and understanding has not been one-sided. Returning United States nutrition survey team members are doing "double duty." They are serving as individual ambassadors for the countries visited. Friendships have been created of much longer duration than just the three-month tour. A part of what has been accomplished can be measured by the continued flow of correspondence, exchanging scientific information, requesting technical advice on specific problems, and reporting progress.

COMMENTS

Opportunity for Learning. Nutrition surveys in the developing countries afford an opportunity for experience and training personnel not only of the host country but also of the United States team in a wide variety of nutritional disease patterns. Concurrent with present-day interest in the relationship of diet to heart disease, dental caries, cancer, and other conditions, the surveys present an excellent opportunity for further study of these problems. The program of the Committee anticipates conducting three nutrition surveys per year, with a continued follow-up in countries previously surveyed.

Need for Nutrition Research. The need for a more definitive, practical, laboratory method to assess riboflavin nutriture, especially in populations that are subsisting on suboptimal or borderline intake of thiamine, has been mentioned. The possible rela-

tion of low vitamin A intake to the incidence and severity of trachoma is of special interest in many areas of the world. A problem of considerable concern in the Near East is the high incidence of kidney stones. Is this of nutritional origin? Is the high incidence of parotid enlargement noted by Sandstead, Koehn, and Sessions[2] in Korea in 1953 of nutritional origin? This appears likely, since the incidence noted in the 1956 survey was markedly reduced.

In Libya a special nutrition condition was noted. The dietary intake of calories, riboflavin, thiamine, vitamin C, and vitamin A was at levels one would classify as suboptimal to deficient. There also was a high incidence of troops with low serum vitamin C and low levels of urinary excretion of thiamine and N^1-methylnicotinamide. However, the classical signs of active nutrition deficiency were present in only a relatively small fraction of the men examined. Based solely upon the physical findings, one would be obliged to interpret the data as indicating that no serious nutrition problems existed, but when the biochemical findings are considered together with the dietary intake studies it becomes apparent that nutrition problems do exist. These findings offer a challenge to nutrition researchers and emphasize the need for study in the field of suboptimal intakes of multiple nutrients and physiologic adaptation as related to health, work output, and resistance to disease.

Reports Prepared by the Committee. The following reports on individual nutrition surveys and suggestions for corrective action have been prepared by the Committee, and a limited number of copies are available on request from the Executive Director, Interdepartmental Committee on Nutrition for National Defense, National Institutes of Health, Bethesda 14, Md.

1. Report on Mission to Near East, April 1955, by Dr. Frank B. Berry and Dr. Harold R. Sandstead.

2. Trip to the Middle (Near) East, November 1956, by Dr. Frank B. Berry and Dr. A. E. Schaefer.

3. Rice Enrichment in Taiwan, June 1955.

4. Iran: Nutrition Survey of the Armed Forces, Aug. 1956.

5. Pakistan: Nutrition Survey of the Armed Forces, Sept. 1956.

6. Iran: Nutrition Survey of the Armed Forces. Supplement No. 1—The Khash Survey, Dec. 1956.

7. Korea: Nutrition Survey of the Armed Forces, April 1957.

8. Philippines: Nutrition Survey of the Armed Forces, Nov. 1957.

9. Turkey: Nutrition Survey of the Armed Forces, Dec. 1957.

10. Libya: Nutrition Survey of the Armed Forces and Civilians, Dec. 1957.

SUMMARY

The Interdepartmental Committee on Nutrition for National Defense was established early in 1955 by the Departments of Defense; State; Agriculture; and Health, Education, and Welfare; plus the International Cooperation Administration and (later) the Atomic Energy Commission. Its purpose was to deal with nutrition problems of technical, military, and economic importance in certain foreign countries. Nutrition surveys have been made in Iran, Pakistan, the Philippines, Turkey, Korea, and Libya, on request from the governments of these six countries. Some 12 American educational institutions have released key personnel for the survey teams. The deficiencies most commonly noted were of riboflavin, thiamine, and vitamins A and C; to some extent, of protein and total calories. Notable improvements in nutrition of armed forces personnel are being brought about by host countries through actions based on recommendations made as a result of the surveys.

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WISE COUNSEL

"Paul, the apostle, in his first epistle to the Thessalonians uttered the well known thought, 'Prove all things; hold fast that which is good.' This counsel is particularly applicable to those who tend to worship the present and to scorn the past. The present may indeed represent the high, immediate mountain view of medicine, but for all that the valleys of the past and the smaller mountain ranges that confine them are willy-nilly part of the present. A mere awareness of Greek, Hebraic, Arabic and Christian traditions as they relate to the present will give a physician a sense of pride in his calling and a feeling of being nearly complete in his total capabilities as he concerns himself with ethics, scientific education or patient-physician relations."

—From EDITORIAL
in *New England Journal of Medicine*
p. 290, Aug. 8, 1957

RAPID SURVEY OF DELINQUENT SERVICEMEN

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THE problem of the undesirable individual in service is a perennial one. Delinquent and recidivistic youths are a source of enormous expense and impediment to the Armed Forces. Efforts directed toward the rehabilitation and integration of these functionally antisocial persons are sometimes effective. Frequently, however, all measures that are offered or forced upon the man fail, and at length his offenses lead to a discharge through court-martial (bad conduct or dishonorable discharge). Short of this his repeated petty offenses may lead to administrative separation for reason of unfitness (undesirable discharge) or unsuitability (general discharge). This is not meant to imply that an undesirable or general discharge is given in lieu of punishment; rather, it is a convenience to the service in ridding itself of the unfit or unsuitable.

Observation of the course of many of these delinquents leads to the conclusion that it would be of considerable value to the service to be able to distinguish early between (a) the "hopeless" delinquent and (b) the type of deviant youth who might benefit by rehabilitation efforts and eventually effect an adequate service adjustment. A decision having been made, the "hopeless" delinquent could be expeditiously removed from service. Such a decision, however, involves the danger of eliminating the potentially productive man along with the recidivist. Furthermore, there is no check on the decisions, because future service adjustment—good or bad—has been precluded by the separation action.

Despite this pitfall there are many cases where careful scrutiny allows no other conclusion than that the individual is incapable of adequate adjustment. Although such men may not have completely exasperated authority or be on the eve of a court-martial, it is obvious than an unfavorable outcome is inevitable. For such cases, screening-out procedures would be of considerable value to the service.

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An approach to the problem of the undesirable individual in service that appears to be practical and economical is used in this division. In brief, the method consists of the evaluation of all brig prisoners by the division psychiatrist with regard to their desirability. The initial problem in weeding out noneffective personnel lies in locating the suspected population, and a ready-made group presents itself in the brig inmates. Although many undesirables will not be in the brig at any one time and others will never be in the brig at any time, periodic surveys of all brig prisoners should establish contact with the bulk of service delinquents.

METHODS

In arriving at his evaluation, the psychiatrist uses four sources of information on the prisoner under consideration: (1) health record, (2) service record, (3) brig adjustment, and (4) clinical interview. The first step is review of the health and service records, several areas being specifically noted. In the health record, the pertinent areas are: (1) previous psychiatric contacts, and the results and circumstances of such contacts; (2) injuries sustained; this data often gives a clue as to the kind of violence and accidents in which the man has been involved; (3) physical profile (PULHES)[1] changes, particularly the S (neuropsychiatric) factor; (4) venereal diseases; and (5) rough estimate of the man's sick calls and the medication prescribed. The service record is examined in four areas particularly: (1) offenses and punishments; (2) promotions and awards; (3) proficiency scores at the time of enlistment; and (4) transfers and reassignments.

These data often presented a telling picture of the serviceman's level of adjustment. The records readily revealed the men with the grossest failures in military adjustment, as well as the men who had generally succeeded in service prior to the offense causing incarceration. The combined data, arranged chronologically, was useful in discerning patterns of maladjustment for inquiry in the clinical interview. For example, several years of unobtrusive adjustment may have been punctuated by a quick succession of offenses; or the man's periodic offenses may have been closely paralleled by the appearance of psychiatric and physical complaints, suggesting that his antisocial behavior is the acting-out of a particular upsurge of psychological malaise.

The next step is a brief inquiry from the brig warden regarding the prisoner's brig adjustment. The warden's observations give a brief, longitudinal picture of the man's adjustment in a rigid authoritarian environment.

The examination of the individual is completed with a clinical interview by the psychiatrist. The function of the interview is to supplement the available data in arriving at a decision on the

individual's fitness and desirability to the service. In many cases it is readily discernible that administrative separation from the service is not warranted. The interview might take only a few minutes to confirm the fact that the man has an adequate service record marred by a rare or single offense. An adverse decision, recommending separation, requires more consideration. Occasionally two or three spaced interviews are necessary for complete evaluation. Psychologic testing is not used.

Interviewing brig prisoners proved to be surprisingly easy. Most prisoners, regardless of clinical features, spoke readily in interview. Although many were guarded, evasive, or fearful, it was rare to encounter a prisoner who did not respond in the interview. The non-directive aspects of the clinical interview in juxtaposition to the brig routine and its extreme ban on interpersonal communication was a disarming experience to the prisoner. Many prisoners were anxious to communicate with the interviewer and expressed gratitude at the opportunity. Although the interviewer was aware of the manipulative aspects of psychopathic behavior, the ease of communication in this setting remains a striking reality.

EVALUATION

The combined longitudinal and cross-sectional data are evaluated and one of the following recommendations is made with regard to the prisoner's post-incarceration status: (1) "Duty," meaning a return to full duty status following appropriate legal action; (2) "Duty Trial," meaning deferment of any existing action for discharge pending further trial at duty or retraining; (3) "Separation: Unfitness," meaning it is recommended that the prisoner be administratively separated from service for reason of unfitness;[2] (4) "Separation: Unsuitability," meaning it is recommended that the prisoner be administratively separated from service for reason of unsuitability;[2] or (5) "Treatment," meaning that, where practicable, the individual will be treated psychiatrically within his command.

Where appropriate, a clinical psychiatric diagnosis was made using the standard Armed Forces nomenclature. Where no noteworthy psychiatric symptoms or traits were manifest, no diagnosis was applied. On those men who received a recommendation of administrative separation, a diagnosis of a personality disorder always was made. Alcoholism and other disorders sometimes were present. When a diagnosis of psychosis was made, the man was removed from the punitive situation through medical channels. When a prisoner was recommended for administrative separation, the psychiatric diagnosis of a personality disorder was used as a basis for listing in his health record the S (neuropsychiatric) factor of the PULHES profile[1] as 3 T (temporary).

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DISCUSSION

Psychiatric screening-out procedures for undesirable servicemen have not been accepted without question or criticism. It is pertinent here to consider some of the controversial aspects of military psychiatric screening. Glass and associates,[3,4] in a detailed analysis of the screening process, compared predictions on 505 men made at induction with performance during their subsequent two years of service. The psychiatrist had predicted on a four-point scale (above average, average, below average, poor) the adjustment of the man in three military zones (combat, combat support, rear). The authors showed that the psychiatrist tended to underestimate the performance of a psychiatrically handicapped serviceman. They found the psychiatric predictions to be poorly correlated with actual performance, and pointed out that relying on psychiatric prediction for the elimination of undesirable servicemen would result in great manpower waste, many men being eliminated who would have been capable of completing their tour of duty despite psychiatric handicap.

There are significant differences between the method described and the wholesale screening of inductees.[3,5] The latter may involve broad and elusive extrapolations. Not only does the predictor use past civilian adjustment to gauge future military adjustment, but also he may be called upon to consider several military environments in his forecasting. Extrapolations are minimized in the present method by two factors: (1) the available data, and (2) the focus of the prediction. In the population here evaluated, the individual had been in service long enough to attain a status of prisoner. He had had time to make some service adjustment, and perhaps to form a set of attitudes toward the service. Many of these data are available to the psychiatrist.

It would appear reasonable that a prediction of future military adjustment would be more valid when based on past military adjustment than when based on past civilian adjustment. Furthermore, we are not concerned with vague or global predictions of adjustment. In the method described here, the important concern is limited to that of the disciplinary future of the serviceman, i. e., the *diagnosis of recidivism*. Psychopathology and the clinical picture, although useful in the psychiatrist's thinking, become secondary to this functional diagnosis. The question: Will the man repeat his delinquency; if so, to what extent? becomes the end point of the evaluation process and leads to the decision on his desirability. By the use of a specific focus and data that are highly relevant to military adjustment, the psychiatrist is placed in a position favoring the validity of his screening-out decision.

The career of the psychiatrically handicapped serviceman deserves some comment. Although many such men are able to com-

plete their tours, their actual functioning is often unproductive. They may complete "successful" tours only at great expense to the service in the form of hospitalizations, accidents, and legal and punitive actions. In addition, there is the effect of such men on the functioning and morale of their units.

The additional costs of utilizing marginal manpower have been demonstrated concretely in a number of follow-up studies of the service careers of these men.[6-8] When marginally adjusted men were sent back to duty, the number of hospitalizations and disciplinary difficulties was several times that of their normal colleagues. Other studies have demonstrated that, where early psychiatric screening-out is sparingly used, there is a substantially higher rate of psychiatric discharges at later stages.[5] Conversely, the liberal use of screening-out procedures early in training is correlated with a reduced incidence of later psychiatric discharges.

The military psychiatrist is in a unique position with regard to available data. He is the only military person available who is equipped to evaluate all of the aspects of the total personality that must be considered: health record, service career, character structure, and psychopathology. The military psychiatrist is equipped to evaluate and synthesize the medical, military, and psychiatric facts present. The strategic use of the military psychiatrist in evaluating brig prisoners can be of high economic value in cutting short recidivistic careers and eliminating the legal requirements entailed in these careers.

The method has been described as it was applied in one Marine division. Obviously, it can be applied to any military service where a prison population and military psychiatrist are available.

SUMMARY

A method for the application of psychiatric survey to a pooled delinquent population has been described. The goal of this survey is to achieve the early elimination of undesirable personnel from military service before further expense is entailed.

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CASE REPORTS

Congenital Galactosemia

CLAUDE E. BENNETT, *Captain, MC, USA*

THE CLINICAL syndrome of congenital galactosemia is now a well-recognized entity with approximately 45 cases having been well documented. The relative rarity of this metabolic disorder, in which normal physical and mental development can be expected with proper management, prompts the following case report and discussion.

CASE REPORT

An apparently normal male infant, weighing 7 lb 4½ oz, was delivered following a normal pregnancy. His father, mother, and one sibling were normal. Following delivery he received the usual care given newborn infants and was started on an evaporated milk formula. While in the nursery, it was noted that his stools were loose and watery. Jaundice appeared the third day and persisted about two weeks. Due to the persistence of loose stools, several changes in formula were made, but without significant improvement.

At three weeks of age, abdominal distension was noted. Because the loose stools persisted, he was started at about four weeks of age on sulfaguanidine and his formula changed to skimmed milk and a banana preparation. There was slight improvement in the number and consistency of his stools, but the abdominal distension became more marked.

The infant was hospitalized at one month of age at a civilian hospital, at which time ascites was noted and an abdominal parancentesis was performed, with removal of 30 ml of clear, light-yellow fluid. At that time, his hemoglobin was 10.2 grams per 100 ml, and the white blood cell count was 39,750 cells per μl with a differential count of 2 per cent lymphocytes, 57 per cent neutrophils, 9 per cent band forms, 1 per cent metamyelocytes, and 7 per cent monocytes. Urinalysis revealed 2 to 3 plus albumin, 2 plus sugar, and numerous coarse and a few fine granular casts. The urine tested negative for bile and acetone. No hepatomegaly was noted at that time.

The following day the patient was transferred to this hospital. On admission, examination revealed a pale, malnourished infant with slight puffiness of the face and eyelids and moderate edema of the sacrum, scrotum, and the lower extremities (fig. 1). The abdomen was obviously

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distended; flank and shifting dullness were present. The liver was palpable 3 cm below the right costal margin. The superficial venous pattern of the abdominal wall was prominent. Examination was not otherwise remarkable.

Figure 1. Infant at one month of age, prior to institution of therapy.

The initial laboratory studies revealed the following: hemoglobin, 10.8 grams per 100 ml; nonprotein nitrogen, 50 mg per 100 ml; creatinine, 1.5 mg per 100 ml; fasting blood sugar, 178 mg per 100 ml; total protein 3.4 (albumin 1.7, globulin 1.8), grams per 100 ml. Urinalysis revealed 4 plus sugar with no acetone. After fermentation with brewer's yeast, the specimen still tested 4 plus for reducing substance, and galactosazone crystals were demonstrated by the mucic acid and

osazone tests. Roentgenographic studies revealed ascites but no other significant abnormality. A large hematoma developed at the site of the femoral puncture.

A tentative diagnosis of galactosemia was made and the patient was put on a milk-free diet, a soybean preparation being used. Within 24 hours, the urine was free of reducing substance. Within four days, the edema had disappeared. The ascites had progressed, however, causing moderate respiratory embarrassment. An abdominal parancentesis was performed, with removal of 300 ml of straw-colored fluid, and the patient was given a transfusion of 75 ml of whole blood.

The results of a galactose tolerance test, followed by a glucose tolerance test for comparison, are shown in figure 2. During the galactose tolerance test the patient's urine tested 4-plus positive for sugar, whereas during the glucose tolerance test it was negative for sugar.

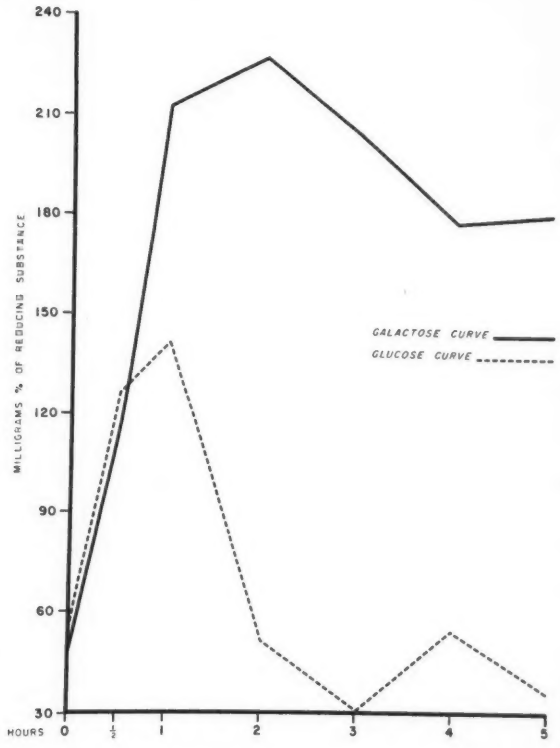

Figure 2. Comparison of results of galactose and glucose tolerance tests.

The infant showed rapid improvement. After two days the ascites had disappeared and his weight was 6 lb 6¾ oz. Three weeks after therapy was initiated, he weighed 7 lb 13½ oz; the liver had diminished in size, but was still palpable; and he was discharged to the care of his parents on a milk-free diet (fig. 3). Follow-up at four months of age, three months after being put on a milk-free (galactose-free) diet, revealed a normal infant (fig. 4). He has been continued on a milk-free diet, and at the last follow-up, at age 16 months, he was reported to be normal with no evidence of mental retardation or other abnormality.

Galactose tolerance tests on the patient's parents and sibling were interpreted as normal.

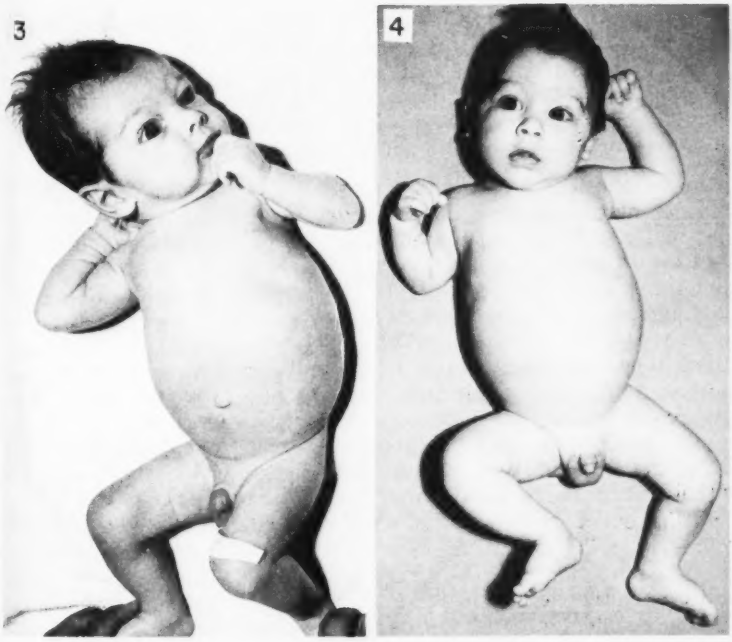

Figure 3. Infant three weeks after institution of milk-free diet. Figure 4. Infant at four months of age.

DISCUSSION

This syndrome was clearly described by Göppert[1] in 1917, but the first case to appear in the American literature was reported by Mason and Turner[2] in 1935. A characteristic picture is now recognized, the most common features being failure to thrive, hepatomegaly, galactosuria, proteinuria, and aminoaciduria. Less commonly, jaundice, vomiting and diarrhea, pyrexia, ascites, edema, and hemorrhagic tendencies appear. If the patient is not

treated within the first 6 to 8 weeks, cataracts and mental retardation become part of the clinical picture.

The primary disorder in this condition is biochemical, an enzymatic block in galactose metabolism that prevents galactose from entering into the regular metabolic pathways. Schwarz and associates[3] recently showed that in untreated galactosemic patients there is a marked accumulation of galactose-1-phosphate in the erythrocytes. Kalckar and associates[4] and Isselbacher and co-workers[5] confirmed the work of Schwarz and associates and were able to demonstrate that the basic defect is the lack of the enzyme phosphogalactose-uridyl transferase which catalyzes the reaction in which galactose-1-phosphate reacts with uridine diphosphoglucose to form the nucleotide uridine diphosphogalactose. They also demonstrated the presence of other enzymes necessary for the further utilization of galactose and its conversion into glucose-1-phosphate, and thus into the regular carbohydrate metabolic pathway. They concluded from their investigations that galactosemia represents the deficit of a single enzyme.

Mason and Turner attributed most of the pathologic changes in this disorder to the low blood glucose level that is an accompanying feature. They postulated that the low blood glucose level resulted in relative starvation of all tissues and eventual impairment of function of all cells of the body. Mellinkoff, Roth, and MacLaggan[6] questioned this hypothesis and were among the first to suggest the toxic effect of high serum levels of galactose. Bruck and Rapoport[7] pointed out that hypoglycemia from other causes such as von Gierke's disease and hyperinsulinism does not result in similar pathologic changes. They considered the severe manifestations of galactosemia to be toxic effects of high blood galactose levels. Other investigators[8-11] believe that the pathologic changes result from high blood galactose levels, but that the exact mechanism is not fully understood. The evidence seems to point to the direct toxic effect of galactose; however, competitive interference by high galactose levels with the availability of glucose for proper cell metabolism cannot be ruled out as a possible factor in the development of cataracts and mental retardation.

Liver damage occurs early, probably during the first week of life. There are no pathognomonic changes, but various degrees of parenchymal necrosis and fatty degeneration, with consequent disorganization of the liver pattern, have been noted. In older children, early hepatic fibrosis and fatty infiltration, and in some cases typical cirrhosis, have been observed.[12-16] Early hepatic changes are reversible; liver function improves and liver size decreases with the elimination of galactose from the diet.[6, 12-14, 16, 17] Cox and Pugh[12] stated that if the patient survives the critical early months of life, liver repair occurs even

though galactose is not removed from the diet. Hsia and associates[8] while concurring with the concept that the altered hepatic physiology results from the toxic action of elevated circulating galactose, pointed out that chronic loss of amino acids through the urine also will cause liver damage and cirrhosis.

Galactosuria has been shown by Cusworth, Dent, and Flynn[18] to occur as soon as the plasma galactose level is raised and to stop when the plasma galactose level returns to normal, which suggest that galactosuria is due to the rise in the plasma levels of galactose. Komrower and associates[10] demonstrated that proteinuria, while not appearing promptly with the rise in the serum galactose level, appears without fail within 48 hours following galactose feeding and increases steadily, with loss of substantial quantities of protein. The proteinuria diminishes rapidly following the elimination of galactose, and disappears after 4 or 5 days. Aminoaciduria occurs only after several days of high levels of galactose in the plasma, and disappears slowly over a period of several days after plasma galactose levels have returned to normal.[8, 10] These studies suggest that the proteinuria and aminoaciduria result from the toxic effect of galactose.

Holzel and Komrower[9] were the first to describe the presence of gross aminoaciduria in untreated galactosemic patients. Hsia and associates, using paper partition chromatography technics, demonstrated that the amino-acid pattern is essentially similar in all cases, no single amino acid being excessively prominent. Both Hsia and co-workers and Komrower and associates, in similar studies, demonstrated that it was possible to restore the urine amino-acid pattern to normal by offering a patient a galactose-free diet, and to reproduce the abnormal picture by introducing sufficient amounts of galactose into the diet.

Donnell and Lann,[19] in a review of the literature, reported four additional cases. They stated that in only one reported case, and that one unproven, has acetone been noted in the urine. Komrower and associates, in studying two infants with this disorder, noted that both children showed the normal renal mechanism of acidification and had no significant alteration in the urinary excretion of sodium and potassium during the galactose-feeding experiment. Also, the blood urea was found to be within normal limits. The specific gravity of the urine varied considerably during this experiment and revealed ability of the kidneys to dilute and concentrate normally. They concluded that there is no permanent renal damage in patients with galactosemia who are properly treated.

Cataracts are a common finding in untreated and late treated cases. Ritter and Cannon[11] observed that infants in whom the diagnosis was made before they were six to eight weeks of age were free of cataracts or had minor ones that were reversible,

provided galactose was removed from the diet before the patient was three months old. Similar regression or disappearance of cataracts in infants who were put on a galactose-free diet in early life, and failure of regression in untreated patients or those treated too late, has been noted by other investigators.[17, 19]

Mental retardation appears to be the rule in the group treated late or not at all, while infants put on a galactose-free diet during the first six to eight weeks of life have shown normal development. Bain and associates[17] reported two cases in siblings, one a slightly retarded child in whom the disease was diagnosed at four months. In the other the diagnosis was made in the first week of life, and the child was normal. Mental retardation, which is not reversible, appears to be related to the duration of the untreated disorder.[7, 20, 21]

Göppert was the first to note the familial incidence of galactosemia. In reviewing the 25 cases reported up to the end of 1952, Cox and Pugh again noted the familial incidence, inasmuch as these 25 cases were from 17 families. Holzel and Komrower reviewed the literature on the cases with familial incidence, proven and assumed, and studied five cases in detail. Galactose tolerance tests were carried out on many relatives of these five patients. In each family at least one of the parents and many other relatives who had no clinical manifestation of the disorder were found to react abnormally to the galactose tolerance tests. They concluded than an abnormal galactose utilization as indicated by an abnormal tolerance test but without clinical manifestations is inherited as an heterozygous character, while clinical galactosemia may be transmitted as a homozygous recessive gene.

CONCLUSIONS

The diagnosis of galactosemia should be considered in any infant who fails to thrive, develops hepatomegaly and proteinuria, and shows a reducing substance in the urine. The absence of acetone in the urine in the presence of 4-plus sugar suggest this disorder. Definite diagnosis is dependent on the demonstration of persistent galactosuria. High blood galactose, the characteristic galactose tolerance curve, and the response to therapy are confirmatory. Due to the genetic factor, any newborn sibling of a galactosemic patient should be studied during the neonatal period for galactose intolerance, because it is possible to make the diagnosis at this time.

This is one inherent metabolic defect that can be treated satisfactorily. While the inherent defect remains, normal development can be obtained by the early exclusion of galactose-containing foods from the diet. The finding of a specific enzymatic defect suggests that a galactosemic patient should be continued indefinitely on an essentially galactose-free diet.

SUMMARY

A case of the relatively rare disease, congenital galactosemia, is presented to emphasize the urgent necessity for early diagnosis and appropriate treatment. Infants put on a galactose-free diet before the age of three months develop normally, whereas those not treated or treated too late suffer serious injury including liver damage, cataracts, and mental retardation.

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Unusual Reaction to Local Anesthesia

Gangrene of the Prepuce

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MEDICAL LITERATURE is replete with reports such as that of Morrisset[1] of systemic reactions to local anesthesia. Unfavorable local reactions have not been commonly recorded, however, and a case of gangrene of the prepuce following local anesthesia is worthy of comment.

CASE REPORT

A 20-year-old man was admitted to the hospital of this naval station for a routine circumcision. History revealed only difficulty in retracting the prepuce and therefore difficulty in maintaining cleanliness thereunder. There was no history of urinary difficulty or of peculiarity of the stream. Physical examination was normal except for the redundant prepuce, which retracted with difficulty. After the customary preoperative studies, results of which were within normal limits, the patient was taken to the operating room where the pubic and penile regions were cleansed with pHrisoHex (brand of hexachlorophene) and draped with sterile drapes. The skin was infiltrated with 1 per cent Xylocaine Hydrochloride (brand of lidocaine hydrochloride) containing 1:100,000 Adrenalin (brand of epinephrine). The sites of injection were circumferentially at the level of the sulcus, at the frenum, and at both sides of the midline at the base of the penis. No excessive blanching of the skin is recorded.

Upon retracting the prepuce, a minor degree of hypospadias and chordee was found at the base of the frenum. The hypospadias was corrected with chromic catgut sutures. The chordee was released. During this procedure the frenular artery was ligated in the distal frenum. The prepuce was replaced and a nonconstricting dressing applied.

The immediate postoperative course was not remarkable. The patient voided spontaneously with a normal stream. About 48 hours after the operation, a dark-red swelling of the dorsolateral aspect of the prepuce was noted. This progressed to bleb and vesicle formation and eventual gangrene of an area 3 cm in diameter. This area did not appear to be

From U. S. Naval Station, Navy No. 127, Box 2, c/o Postmaster, Seattle, Wash.

one supplied by the frenular artery in its distal course. The remaining prepuce became edematous and dark in color, but the reaction did not progress to gangrene. There was no evidence of secondary infection as exemplified by local pus, or of systemic reaction as expressed by elevated pulse, temperature, or white blood cell count.

Local warm wet dressings and prophylactic Terramycin (brand of oxytetracycline) produced subsidence of the edema and eventual separation of a black necrotic area on the dorsolateral aspect. When this area had healed, a routine circumcision under Pentothal Sodium (brand of thiopental sodium) was performed. The patient returned to duty on the 6th postoperative day.

DISCUSSION

Gangrene of the prepuce is uncommon. It can occur following neglected paraphimosis, but has seldom been reported after local anesthesia, although Moore[2] stated that slough may follow infiltration of the prepuce. Because the method of infiltration used was a usual one, a review of the anatomy of the prepuce and of the action of local anesthesia containing Adrenalin was undertaken.

The prepuce is the integument of the penis reflected upon itself at the level of the sulcus.[3] Because the skin of the penis lacks adipose tissue, it has difficulty in absorbing excess fluid from any cause. Its blood supply is derived in large part from the dorsal artery and must pierce Buck's fascia to reach the skin. The venous drainage is to the dorsal vein. This must pass through Colles' fascia. Both, therefore, pass through relatively inelastic tissue that could act to restrict blood flow. Because of the structure of arteries, they are more likely to overcome this resistance than the veins, and under the proper circumstances they might produce an excess of fluid in the integument which the venous side could not relieve. This would add a further obstructive factor to the venous return that might be sufficient to cause the venous type of gangrene seen in this case.

Epinephrine produces vasoconstriction followed by a proportionate hyperemia.[4,5] Southworth, Hingson, and Pitkin[5] believed that in dentistry most of the discomfort following local anesthesia is caused by this proportionate hyperemia in an area which is unable to cope with such an increase in fluid. These authors condemned the use of solutions containing 1:30,000 or 1:50,000 Adrenalin as being the cause of some of the untoward reactions attributed to the local anesthesia. They stated that a 1:200,000 dilution is adequate for hemostasis and does not cause subsequent unpleasant symptoms. Wilson[6] commented that 1:300,000 Adrenalin produced adequate hemostasis. As 1:100,000 Adrenalin was used in our anesthetic solution—strong enough to produce marked blanching of the skin of the back—a marked

proportionate hyperemia should be expected after its use. It is probable, therefore, that such a reaction was sufficient to overwhelm the ability of the prepuce to remove the excess fluid delivered, with resulting "wet" gangrene.

SUMMARY

A case is reported of gangrene of the prepuce following use of a 1 per cent solution of Xylocaine Hydrochloride (brand of lidocaine hydrochloride) containing 1:100,000 Adrenalin (brand of epinephrine) as a local anesthetic in preparation for a routine circumcision.

The probable role of the Adrenalin in producing untoward effects is discussed.

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MEDICINE'S PLACE IN SOCIETY

"This is not a day for boasting. Instead, it is one on which we of the medical profession accept a challenge. That challenge is one of leadership. Who knows better the social and economic problems relating to medicine than the medical profession itself? Then it is our moral and social obligation to aid in bringing about the indicated adjustments and improvements that will keep medicine in its rightful position in modern society.

"Doctors are entitled to remuneration for their services, yet any man endowed with the talent for being a true physician has no right to commercialize that talent. By the same token, the person who is able to pay has no right to free services. There is no method by which the value of good medical service can be appraised."

—W. BRUCE SCHAEFER, M. D.
in *Journal of Medical Association of Georgia*
p. 319, July 1957

PRESIDENT GREETS CIVILIAN MEDICAL CONSULTANTS IN WASHINGTON MEETING

President Eisenhower made a surprise visit to the twelfth annual meeting of the Civilian Medical Consultants to the Armed Forces at Walter Reed Army Medical Center on 11 November 1957. He spoke briefly during the morning session of the meeting and thanked the consultants for their many contributions to military and civilian medicine. Mr. James C. Hagerty, Press Secretary to the President, was also a speaker at the meeting.

President Eisenhower is shown with Doctor I. S. Ravdin, Professor of Surgery at the University of Pennsylvania School of Medicine, at the recent meeting of the Civilian Medical Consultants to the Armed Forces.

Doctor George O. Eaton, a Baltimore orthopedic surgeon, was elected president of the consultants group. He succeeds Doctor Donald M. Pillsbury, Professor of Dermatology at the University of Pennsylvania School of Medicine. Doctor Bruce Webster, of New York City, was chosen vice president of the consultants, and will succeed Doctor Eaton as president next year. Doctors William A. Howard and Theodore J. Abernathy of Washington were elected secretary and treasurer respectively.

Doctor Donald M. Pillsbury, right, is shown introducing Mr. James C. Hagerty, Press Secretary to the President.

Doctor George O. Eaton, Baltimore, President of the Civilian Medical Consultants to the Armed Forces.

As a timely presentation, the 135 civilian physicians and 30 guests were given a briefing on the latest military developments in Asian influenza by Colonel Arthur P. Long, MC, USA. The medical programs and problems of the respective departments were discussed by Major General Silas B. Hays, Surgeon General of the Army, Rear Admiral Frank P. Gilmore, USN, Assistant Chief for Planning and Logistics, Bureau of Medicine and Surgery, and Major General Olin F. McIlnay, Deputy Surgeon General of the Air Force.

GENERAL TWITCHELL NAMED USAFE SURGEON

Brigadier General Harold H. Twitchell, USAF (MC), Surgeon of the Continental Air Command, Mitchel Air Force Base, N. Y., since September 1955, has been named Surgeon of U. S. Air Forces in Europe with headquarters in Wiesbaden, Germany. He succeeds Major General Harry G. Armstrong, USAF (MC), former Surgeon General of the Air Force.

General Twitchell.

A graduate of the University of Vermont College of Medicine in 1929, General Twitchell was the World War II staff surgeon of the Twentieth Air Force in the Pacific theater. Prior to his assignment to the Continental Air Command he was Director of Professional Services in the Office of the Surgeon General. He is a native of Lancaster, N. H.

NAVY MEDICAL DEPARTMENT MARKS MILESTONE IN NUCLEAR MEDICINE

The Navy Medical Department marked a milestone in nuclear medicine on 15 November 1957, when the first nuclear reactor to be installed in a hospital solely for medical use was dedicated at the U. S. Naval Hospital, Bethesda, Md.

Rear Admiral Bartholomew W. Hogan, Surgeon General of the Navy (center), cuts the ribbon at dedication ceremonies of the first nuclear reactor installed in a hospital for medical use. Shown from left to right are: Honorable Dan Kimball, former Secretary of the Navy; Honorable Sterling Cole, Congressman from New York; Captain Sylvester F. Williams, MC, USN; Admiral Hogan; Captain E. Richard King, MC, USN; Honorable William B. Franke, Under Secretary of the Navy; and Rear Admiral Thomas F. Cooper, MC, USN. Part of the reactor can be seen in the background.

The Honorable Sterling Cole, Member of Congress from New York and Director General, International Atomic Energy Agency, was the guest speaker at the dedication ceremony. He told the several hundred doctors, scientists, nurses, technicians, and their guests, both military and civilian, that the reactor was the forerunner of hundreds of similar devices that some day would be used in hospitals throughout the world to relieve human suffering.

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Representative Cole also said that it was his hope that the energy of the atom should, like the reactor being dedicated, forever be the servant and not the master of mankind. He told the audience that the reactor was being dedicated to the service of humanity and, in so doing, man's inventive genius was being directed to its highest purpose, that of bringing relief from pain, anguish, and suffering.

The Under Secretary of the Navy, the Honorable William B. Franke, was a guest at the ceremony. Other speakers at the ceremony were: the Honorable Dan Kimball, former Secretary of the Navy, and now President of the Aerojet-General Nucleonics Laboratories, San Ramon, Calif., manufacturers of the reactor; the Surgeon General of the Navy, Rear Admiral Bartholomew W. Hogan; Rear Admiral Thomas F. Cooper, MC, USN, commanding officer of the National Naval Medical Center; Captain Edward C. Kenney, MC, USN, commanding officer of the U. S. Naval Hospital; and Captain E. Richard King, MC, USN, head of the Medical Center's Nuclear Reactor Project Committee.

Kimbrough Seminar Held at Walter Reed

The fifth annual James C. Kimbrough Urological Seminar was conducted at Walter Reed Army Hospital, Washington, D. C., 25-27 November 1957. Named in memory of the eminent Army urologist, the late Colonel James C. Kimbrough, the three-day meeting featured guest speakers from the military medical services as well as noted civilian doctors. The course director was Colonel John F. Patton, chief of the urology service.

Civilian physicians who participated in the seminar included Doctors Roger Baker, William P. Herbst, Lloyd G. Lewis, George E. Schreiner, and Othmar C. Solnitzky of Georgetown University School of Medicine, and Hugh J. Jewett and William W. Scott of Johns Hopkins University School of Medicine.

Colonel Kimbrough served as Chief of the Urology Service at Walter Reed from 1946 until his retirement in 1953. At that time, after 36 years with the Army Medical Service, he was designated by an Act of Congress as consultant in urology to Walter Reed Army Medical Center "... in recognition of his outstanding service and contribution to the science of medicine and surgery ...." He remained at Walter Reed in this capacity until his death on 19 August 1956.

A MESSAGE FROM THE A. M. A.

After nearly three years of planning, the Educational Council for Foreign Medical Graduates has placed an "open for business" sign on the door of its offices in suburban Evanston, Ill. The executive director of the Council, which will carry out a detailed and comprehensive program for evaluating foreign medical school graduates, is Doctor Dean F. Smiley, Chicago, Ill., former secretary of the Association of American Medical Colleges.

It was decided three years ago that some form of evaluation service should be established within an independent agency whose affairs would be directed by a board of trustees designated by four co-operating organizations, the American Medical Association, the Association of American Medical Colleges, the American Hospital Association, and the Federation of State Medical Boards of the United States. For the next two years, the Council will be supported by the four sponsoring agencies plus the Kellogg Foundation and the Rockefeller Foundation.

The Council, incorporated in the State of Illinois, will be administered by a 10-member board of trustees—two representatives from each of the four sponsoring agencies and two persons representing the public at large, one named by the U. S. Department of Defense and the other by the U. S. Department of Health, Education, and Welfare. The president of the board is Doctor James Murray Kinsman, dean of the University of Louisville School of Medicine, Louisville, Ky.

How the Council Functions. Doctor Smiley said the Council will distribute to foreign medical graduates around the world authentic information regarding the opportunities and difficulties involved in coming to the United States on an exchange student visa to take intern or resident training in a United States hospital, or coming on an immigrant visa with the hope of becoming licensed to practice.

The Council will make available to properly qualified foreign medical graduates, while still in their own country, all information on how to obtain certification. This involves a three-way screening process:

1. The Council will certify that a student's educational credentials have been checked and found meeting minimal standards —18 years of formal education, including at least four years in a bona fide medical school, but excluding hospital training.

2. The Council will certify that the command of English has been tested and found adequate for assuming an internship in an American hospital.

From the Council on National Defense of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense. —*Editor*

3. The Council will certify that the general knowledge of medicine, as evidenced by passing of the American Medical Qualification Examination, is adequate for assuming an internship in an American hospital.

The Council also will provide hospitals, state licensing boards, and specialty boards which the foreign medical graduates designate with the results of the three-way screening. It also will accumulate and publish each year complete data regarding the number and placement of foreign medical graduates in this country.

Doctor Smiley emphasized that the Council will not serve as a placement agency for either interns or residents; it will not attempt to evaluate the teaching program or inspect or approve any foreign medical school; and it will not act as an intercessor for foreign medical graduates having problems under discussion by state boards of medical licensure or specialty boards.

First Examination in February. Doctor Smiley said that tentative plans call for the first American Medical Qualification Examination for foreign medical graduates already in this country to be held in either February or March 1958, and that the second such examination for foreign medical graduates both here and abroad will be held in either July or August.

Formation of the Council was first announced last February at the fifty-third Congress on Medical Education and Licensure in Chicago. It was the medical profession's answer to the mushrooming problem posed by the thousands of foreign-trained physicians now in the United States.

In discussing the Council's work, Dr. Kinsman said that the screening process was initiated to help maintain the present high medical standards in the United States by making sure that foreign-trained physicians wishing to come here for hospital appointments or practice have reached a level of educational attainment comparable to that of students in approved American medical schools at the time of graduation. "At the same time," he added, "the Council hopes to encourage the well-trained foreign physician to take advantage of the opportunities to further his education in this country."

There has been a continuing influx of foreign-trained physicians to the United States for a long time. At present, there are more than 6,000 such physicians in this country on temporary visas serving as interns or residents. All foreign-trained physicians here on temporary visas are supposed to return to their native countries on completion of their internship or residency training. In addition, there is another group of approximately 1,000 foreign-trained physicians who enter each year as immigrants or as American citizens returning after completing their medical education abroad.

DR. BERRY GIVEN HONORARY FELLOWSHIP IN INTERNATIONAL COLLEGE OF DENTISTS

During the 12th International Dental Congress held in Rome in September 1957, the International College of Dentists conferred honorary fellowships on Doctor Frank B. Berry, Assistant Secretary of Defense (Health and Medical); Doctor John W. Knutson, Chief Dental Officer, U. S. Public Health Service; and Major General Oscar P. Snyder, USA, Retired, formerly Chief of Army Dental Service.

Left to right, General Snyder, Dr. Berry, and Dr. Knutson

The citations, in recognition of services rendered the dental profession, were presented to the three distinguished recipients by Doctor Frank F. Lamons, President of the International College of Dentists, on 3 November 1957, just prior to the annual meeting of the American Dental Association in Miami, Fla.

In a concurrent meeting Colonel Roy L. Bodine, DC, USA, dental surgeon of the Fourth U. S. Army, Fort Sam Houston, Tex., was elected president of the Academy of Implant Dentures. A native of Indianapolis, Ind., Colonel Bodine is a graduate of the State University of Iowa College of Dentistry in the class of 1924.

COLONELS MILLER AND ZAGELOW NAMED TO HIGH POSTS IN AIR FORCE MEDICAL SERVICE

Colonel Robert R. Miller, USAF (VC), has been appointed Assistant for Veterinary Services in the Office of the Air Force Surgeon General, and Colonel Leonard P. Zagelow, USAF (MSC), is the new Chief of the Medical Service Corps, according to a recent announcement by Major General Dan C. Ogle, USAF (MC), Surgeon General of the Air Force.

Colonel Miller

Colonel Zagelow

A native of Boston, Colonel Miller has been staff veterinarian of the Air Defense Command, Colorado Springs, Colo., since graduating from the Air War College in 1952. Previously, he was veterinary staff officer in the Office of the Air Force Inspector General, Kelly Air Force Base, Tex. During the war he served as a veterinary officer in Recife, Brazil, and later was attached to the Joint United States-Brazilian Military Commission at Rio de Janeiro. He was graduated from the Ohio State University College of Veterinary Medicine in 1942.

Colonel Zagelow, who succeeds Colonel Phillip G. Fleetwood, USAF (MSC), the first Chief of the Medical Service Corps, is a former infantry officer who transferred to the Medical Service in February 1938. He was graduated with a degree in pharmacy from Washington State College in 1937, and received his master of science degree from the University of Minnesota in 1951. In World War II, he was inspector of the 35th General Hospital in northern Luzon, P. I., and later executive officer for the Chief Surgeon, Headquarters Army Western Pacific, Manila. Colonel Fleetwood retired on 30 November 1957 after more than 30 years of military service.

GENERAL OGLE DEDICATES NEW UNIT OF LARGEST AIR FORCE HOSPITAL

With the dedication of a new 500-bed facility on 16 November 1957, by Major General Dan C. Ogle, USAF (MC), Surgeon General of the Air Force, Lackland Air Force Base, Tex., now has the largest hospital in major Air Force commands here and overseas. Nearly 1,500 patients can be accommodated in the expanded treatment facilities. Colonel John E. Pluenneke, USAF (MC), is commander of the hospital, which is the key treatment center of the Air Training Command.

New Hospital at Lackland Air Force Base.

General Ogle.

In his presentation, General Ogle emphasized the growth of San Antonio as a leading medical center. He pointed out that in addition to the new Lackland Air Force Base hospital and Brooke Army Medical Center, it is also the home of the new Air Force School of Aviation Medicine under construction at Brooks Air Force Base.

"During the process of selecting a site for the new School of Aviation Medicine," General Ogle told

the large audience of medical officers and civilian physicians and their friends, "a heavily weighted factor served to keep San Antonio from a position of unquestioned first choice. We believed, and still believe, that our new School and research laboratories should be in the neighborhood of a first-class medical school, that much could be gained by association between two such teaching and research institutions. There was no medical school here, but San Antonio was finally selected because of many overriding advantages and because we had faith that this city would one day have its own medical school. I hope it will come in the near future. It is a community and national need that should not be denied."

General Grills welcomes distinguished guests.

Major General Herbert L. Grills, USAF, commander of Lackland Air Force Base, spoke briefly at the ceremony. General Ogle and General Grills were guests of honor of the San Antonio Chamber of Commerce at a dinner on the previous evening. Colonel James G. Moore, USAF (MC), is the surgeon of the Air Training Command which recently transferred its headquarters from Scott Air Force Base, Ill., to Randolph Air Force Base.

The new hospital building, built at a cost of about $9,500,000, was begun on 11 October 1954 and opened for the admission of patients on 16 September 1957. It contains 9 stories and basement of permanent masonry construction with accommodations for 500 beds. Under present plans construction of an additional wing will start this year to provide an additional 500 beds for this large Air Force medical center. A total of 1,800 doctors, nurses, technicians, and administrative personnel is assigned to the center.

OFFICERS CERTIFIED BY SPECIALTY BOARDS

Supplementary Listing

According to information from the Offices of the Surgeons General of the military medical services, the following regular Medical and Dental Corps officers have been certified by the specialty boards indicated since the listings published in previous issues of this *Journal*.

American Board of Pediatrics

David W. Davis, Lt. Col., USAF
Wesley A. Roads, Maj., USAF

American Board of Radiology

Charles F. Krecke, Capt., USAF

American Board of Internal Medicine

Lawrence R. Loftus, Capt., USAF
Gerald I. Maas, Maj., USAF

American Board of Preventive Medicine

Public Health

Joseph W. Cooch, Lt. Col., USA
Robert W. Sherwood, Maj., USA
Arnold M. Reeve, Maj., USA

Aviation Medicine

William O. Bellnoski, Jr., Lt. Col., USAF
William H. Karmany, Lt. Col., USAF

American Board of Periodontology

Allan A. Wallace, Capt., USN

American Board of Prosthodontics

Allen A. Brewer, Lt. Col., USAF
Myron C. Turner, Capt., USN
William M. Marking, Capt., USN

DEATHS

ANDERSON, Marvin Dale, Captain, USAFR (DC), of San Francisco, Calif.; stationed at Chambley Air Base, France; graduated in 1956 from the School of Dentistry, College of Physicians and Surgeons, San Francisco, Calif.; commissioned a first lieutenant in the United States Air Force Reserve 21 July 1956; ordered to active duty 8 September 1956; died 13 November 1957, age 28, near Solgne, France, as the result of an automobile accident.

BRADY, Richard Randall, Lieutenant Colonel, MC, USAR, of Miles City, Mont.; stationed at the U. S. Army Garrison, Southern Area Germany; graduated in 1924 from the University of Nebraska College of Medicine, Omaha, Nebr.; commissioned a first lieutenant in the United States Army Reserve 7 January 1930; ordered to active duty 1 July 1942; died 1 May 1957, age 56, in Germany, of coronary thrombosis.

BROTHERS, James William, Second Lieutenant, ANC, USAR, of Brooklyn, N. Y.; stationed at Fitzsimons Army Hospital, Denver, Colo.; graduated in 1954 from the Brooklyn State Hospital School of Nursing, Brooklyn, N. Y.; served in an enlisted status from 19 January 1955 to 24 April 1956;

commissioned a second lieutenant in the United States Army Reserve 22 March 1956; ordered to active duty 25 April 1956; died 10 October 1957, age 25, at Fitzsimons Army Hospital, of barbiturate poisoning.

CANTRELL, Roy Foster, Captain, MC, USN, of Salem, Ark.; stationed at the U. S. Naval Dispensary, San Francisco, Calif.; graduated in 1928 from the University of Oklahoma School of Medicine, Oklahoma City, Okla.; appointed lieutenant, junior grade, in the United States Navy 5 June 1928; died 1 October 1957, age 60, at the U. S. Naval Hospital, Oakland, Calif., of myocardial infarction.

EMIG, Armin Robert, Lieutenant Colonel, DC, USAR, of Belleville, Ill.; stationed at Fort George G. Meade, Md.; graduated in 1939 from School of Dentistry, St. Louis University, St. Louis, Mo.; commissioned a first lieutenant in the Army of the United States 30 June 1942; ordered to active duty 14 July 1952; died 13 June 1957, age 40, at Walter Reed Army Hospital, Washington, D. C., of metastic carcinoma.

KOPP, Arthur Henry, Lieutenant Colonel, MSC, USAR, of Tacoma, Wash.; stationed at Madigan Army Hospital, Tacoma, Wash.; commissioned a second lieutenant in the United States Army Reserve 22 October 1930; ordered to active duty 4 November 1940; died 11 February 1957, age 55, at Madigan Army Hospital, of carcinoma.

MATTESON, Thurlow Weed, First Lieutenant, MSC, USAR, of Whittier, Calif.; stationed at the U. S. Army Aviation School Regiment, Fort Rucker, Ala.; served in an enlisted status in the United States Army from 1 November 1943 until 26 June 1951; appointed warrant officer, junior grade, in the Army of the United States 15 June 1951; commissioned a second lieutenant in the United States Army Reserve 14 August 1952; died 27 April 1957, age 32, near Alberta, Va., as the result of an aircraft accident.

REEVES, James Aul, Lieutenant, MC, USNR, of San Francisco, Calif.; stationed at the U. S. Naval Hospital, Oakland, Calif.; graduated in 1949 from the University of Southern California School of Medicine, Los Angeles, Calif.; served in an enlisted status in the United States Naval Reserve from 1944 until 1946; appointed ensign (HP) in the U. S. Naval Reserve 25 June 1956; appointed lieutenant, junior grade, U. S. Naval Reserve 11 June 1949; served on active duty from 11 July 1950 to 15 December 1952; recalled to active duty 5 August 1954; died 5 October 1957, age 32, at the U. S. Naval Hospital, Oakland, Calif., of pulmonary embolism.

ROPER, Jack, Lieutenant Colonel, DC, USA, of West Point, Miss.; stationed at Fort Sam Houston, Tex.; graduated in 1945 from the University of Kansas City School of Dentistry, Kansas City, Mo.; commissioned a first lieutenant in the Army of the United States 21 August 1946; ordered to active duty 10 September 1946; died 7 August 1957, age 36, at Brooke Army Hospital, Fort Sam Houston, Tex., of gastrointestinal hemorrhage.

SZWATKOWSKI, Edmund Martin, Captain, DC, USAR, of Rome, N. Y.; stationed at the U. S. Military Academy, West Point, N. Y.; graduated in 1955 from the School of Dentistry, University of Buffalo, Buffalo, N. Y.; commissioned a first lieutenant in the United States Army Reserve 16 May 1956; ordered to active duty 29 June 1956; died 7 October 1957, age 33, at Walter Reed Army Hospital, Washington, D. C., of hepatitis.

WIEMERSLAGE, Grace Edith, Captain, ANC, USAR, of Junction City,Kans.; stationed at the 98th General Hospital, Germany; graduated in 1933 from Asbury Hospital School of Nursing, Salina, Kans.; commissioned a second lieutenant in the Army of the United States and served on active duty from 16 August 1943 to 21 December 1945; ordered to active duty 10 December 1950; died 18 October 1957, age 47, in Germany, of unknown cause.

Reviews of Recent Books

THE PATHOGENESIS OF CORONARY OCCLUSION, by *A. D. Morgan,* M. A., M. D., with a foreword by *John B. Duguid,* M. D. 171 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1956. Price $8.50.

The first half of this book is an excellent review of the high points of the literature on a coronary artery disease and experimental atherosclerosis. The later chapters present the material collected from 40 consecutive cases of advanced coronary disease, in patients 47 to 80 years of age. It is a discussion, with excellent photomicrographs, of histologic serial sections of the occluded portions of the arteries which he develops in support of Duguid's thrombogenic hypothesis of coronary occlusion. This postulates that the typical lesion of atherosclerosis, the subintimal plaque, begins as a thrombosis in the lumen of the artery. The arterial pressure flattens the thrombus against the wall. The internal elastic lamina and endothelium layers grow from the margins burying the thrombus. The subintimal thrombus is then organized by vasa vasorum growing in from the adventitia. The cholesterol crystals from the stroma of enmeshed red cells are remnants of phagocytosis of the thrombus. The inadequate vasa vasorum often hemorrhage into the plaque producing calcification and pressure atrophy of the media. Inadequate organization of large thrombi result in the central softening termed atheromatous abscesses. A vicious circle of abscess rupture with additional thrombosis leads to a layered structure of the plaque increasing the degree of occlusion. The author implies that the lipid infiltration can at most be only a minor cause of plaque formation, and suggests that the possibility of a relationship between fat metabolism and the coagulability of the blood is worthy of fuller investigation.

—*WILLIAM D. PRESTON, Col., USAF (MC)*

AN ATLAS OF CARDIAC SURGERY, prepared by *Jorge A. Rodriguez,* M. D. 250 pages; illustrated. 10½ by 11½ inches in size. W. B. Saunders Co., Philadelphia, Pa., 1957. Price $18.

This atlas contains good technical information pertaining to surgery of the heart. The first section begins with the anatomy of the organ in question. There are 15 full-page plates drawn by the author depicting the anatomy of the heart in situ as compared to the anatomy of the removed organ. This is helpful to the surgeon in making his surgical approach to the heart. With each of these anatomic drawings, a written description of the anatomy as well as the surgical implications, is presented. The second part of the book presents several important adjuvants to cardiac surgery, namely, anaesthesia, cardiac surgical instruments, hypothermia, and three types of mechanical devices used for extracorporeal circulation. The drawings and the names of the instruments are of value to operating room technicians, medical students, and young physicians interested in cardiac surgery. The four remaining sections deal with 29 recognized surgical procedures of the heart. In

preparing these sections the author visited the clinics of 24 prominent cardiac surgeons and recorded their operative technic by firsthand observation.

The author's observations are recorded in the book by legend and drawings. He describes the pathologic anatomy or congenital anomalies, as the case may be, giving the technical steps to repair the condition present. He also gives the anatomic or pathologic variations in the various conditions described. The legend begins with the positioning of the patient on the table and the location of the incision. For each figure in the legend there is a corresponding drawing illustrating the technical maneuver described. These are continued in sequence until the operation is completed. The author points out complications that may occur at the operating table and describes methods of prevention and control.

The work of Doctor Rodriguez is considered a valuable compilation of what is recognized as useful and possible to do in cardiac surgery at the present time. It should be available for the operating room technician, senior medical student, and intern, and in the library of the pediatrician and internist who study and refer patients for cardiac surgery. The resident in cardiac surgery will find it invaluable in mastering the present recognized technic in the specialty.

—*LUTHER G. BELL, Capt., MC, USN*

ORAL MEDICINE, Diagnosis and Treatment, by *Lester W. Burket,* A. B., D. D. S., M. D., Sc. D., with a chapter on Oral Cancer by *S. Gordon Castigliano,* B. A., B. S., M. D., F. A. C. S. 3d edition. 558 pages; 391 illustrations, including 40 subjects in color. J. B. Lippincott Co., Philadelphia, Pa., 1957. Price $14.

There is no doubt that this textbook is one of dentistry's classic contributions to professional literature. It is comprehensive without verbosity, and its style is excellent.

The format makes this book remarkably easy to use, the text being divided into 12 sections which cover general considerations, diseases of anatomic regions and organ systems, occupational hazards, oral cancer, laboratory aids, a color atlas, and a regional diagnostic index. The bibliography is extensive and well selected.

The author has an outstanding international reputation as a teacher and clinician, and his wide experience has enabled him to utilize a large variety of illustrative cases. The text is well and profusely illustrated in black and white, and in addition has a 40-plate, color atlas presenting commonly encountered oral diseases.

This third edition has been extensively revised and in many sections completely rewritten to eliminate outdated material and to fully inform the reader on the most recent advances concerning oral disease. It is highly recommended for all students and practitioners of medicine and dentistry.—*ARTHUR S. TURVILLE, Capt. DC, USN.*

TREVES' SURGICAL APPLIED ANATOMY, Revised by *Lambert Charles Rogers,* V. R. D., M. D., M. Sc., F. R. C. S., F. R. C. S. E., F. R. A. C. S., F. A. C. S. 13th edition. 591 pages; 202 illustrations, 56 in color. Lea & Febiger, Philadelphia, Pa., 1957. Price $7.50.

The study of human anatomy can be a fearsome venture for some, especially when presented in a weighty tome with a multitude of coded footnotes. But the mere size of this worthy little book makes the approach pleasant. It is not spectacular but basic; and detail is used not as unrelated odd facts but as clinically helpful facts related to the anatomy of the part.

The chapter divisions are in the usual categories, *i. e.,* "The Head and Neck," "The Thorax," "The Upper Extremity," "The Abdomen and the Pelvis," "The Lower Extremity," and "The Spine and Spinal Cord."

The format is simple and the use of boldface type in the paragraphical body brings forth to the eye the subject as clearly as the anatomy in a neat dissection. The index is likewise particularly clear and concise. The illustrations are mostly of simple line drawings, some in color, and are spaced judiciously.

Frederick Treves' original purpose in the first edition of this book in 1883 was "to give a precise basis to those incidents and procedures in practice that more especially involve anatomical knowledge" and "on the other hand endue the dull items of that knowledge with meaning and interest by the aid of illustrations drawn from common medical and surgical experience." Lambert Rogers has perpetuated those concepts, and his revised edition should serve admirably as a handy friend for an intern or resident in surgery.

—*RALPH M. MUGRAGE, Capt., MC, USN*

CLINICAL APPLICATIONS OF SUGGESTION AND HYPNOSIS, by *William T. Heron,* M. A., Ph. D. 3d edition. 165 pages. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $3.75.

This well-written short monograph is a practical guide to the use of suggestion and hypnosis by members of professional groups. It describes in simple language the background and theory of hypnosis in direct relationship to its utilization as a therapeutic measure, particularly in such fields as dentistry and obstetrics. Its primary aim is to encourage various therapists to use simple suggestion, and the lighter stages of hypnosis, to facilitate the treatment both for the patient and for the therapist.

Individuals who are adherents of hypnotherapy, or who have a great deal of knowledge about hypnosis, will find nothing new in this presentation. Neophytes in the use of hypnosis for professional treatment will find it easy to comprehend. The application of its principles, however, require careful study and supervision. The individual who would utilize hypnosis must believe in it himself. Suggestion or hypnosis, a stronger and more complex form of suggestion, achieves its ends

because of the affirmative interplay of subtle personal relationships which leads the patient to assume and accept that state of mind or attitude the therapist or hypnotist has decided is in the patients' best interest. The author indicates that unless these technics are used to aid the patient they should not be used at all.

Hypnotherapy must be recognized as only one form of available therapeutics for the relief of all forms of the anxieties experienced by patients. For those interested in utilizing this type of therapy, Dr. Heron's book represents a practical introduction which would best be followed by the examinations and study of other accepted publications on hypnosis. —*LUCIO E. GATTO, Col. USAF (MC)*

PRACTICAL REFRACTION, by *Bernard C. Gettes,* M. D. 170 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1957. Price $6.50.

The material in this manual represents personal experiences of the author gained through years of teaching and examining thousands of eyes. The arrangement of the material is somewhat unorthodox, but it is presented in the manner the author believes most suitable to enable the refractionist to meet the patients' actual refractive needs. Each chapter presents its subject in a reasonable and concise manner. Opinions and procedures are supported by clear reasoning and adequate explanations. The text dealing with Strum's conoid and ophthalmic lenses is especially valuable to those interested in these basic subjects.

There certainly are refractionists who will disagree with the author in the matter of managing hypermetropia. Commendably, however, he has emphasized that there are other effective methods besides his own for dealing with refraction problems. His only plea is that the refractionist know his subject, understand what he is trying to accomplish, and work with thoroughness and accuracy. Emphasis is always on satisfaction from the patients' standpoint. The occasional erroneous or obscure statement noted in the text in no way detracts from the manual, which is well written, of excellent type, and well edited. It is refreshing in its viewpoint and presentation, and is highly recommended for both beginners and experienced refractionists who may be interested in doing a better job.—*WILLIAM L. BERKLEY, Capt., MC, USN*

SCHIZOPHRENIA IN PSYCHOANALYTIC OFFICE PRACTICE, The Society of Medical Psychoanalysts, 1956 Symposium, edited by *Alfred H. Rifkin,* M. D. 30 contributors. 150 pages. Grune & Stratton, Inc., New York, N. Y., 1957. Price $4.

This book consists of the proceedings of a 1956 symposium of the Society of Medical Psychoanalysts on the office treatment of schizophrenia, and contains all of the papers presented with the comments of the discussants. The papers, in general, fall into three categories involving the section on fundamental concepts of the nature of schizophrenia; special problems in treatment, including transference, anxiety and panic; and the treatment of extramural schizophrenia, including

methods of selection of cases and other similar considerations. All of the articles are stimulating and well worth reading. Naturally, a book of this type is of great assistance to the specialist in the field of psychiatry. Unfortunately, as one reads the points of view of the various authors and discussants, one is more than ever struck by the fact that even among expert psychoanalysts, with their considerable experience in diagnostic and therapeutic fields, there is no general basis of agreement as to what, in many instances, constitutes an "ambulatory schizophrenic." This defect in our nosology leads naturally to a considerable degree of variance in the approach to therapy, in the diagnosis of the fundamental condition, and in the handling of certain technical aspects of the psychoanalytic situation.

Some of the chapters, particularly those on problems of negative transference, disliking one's patients, panic, suicide, and the family role in ambulatory treatment, are of particular interest to the individual who practices office psychiatry. There is also an interesting section on treatment of asocial attitudes in ambulatory patients which is well worth reading. As is usually the case, the publication of symposia of this type brings to the field fresh concepts and stimulates thinking concerning new approaches to old problems. This volume is well worth its relatively small price.—*ROY E. CLAUSEN, Jr., Lt. Col., MC, USA*

THE DOCTOR AS A WITNESS, by *John Evarts Tracy*. 221 pages. W. B. Saunders Co., Philadelphia, 1957. Price $4.25.

Because of the large number of civil court cases involving accidents or personal injury in which a physician is called upon to testify, this is a very valuable book to peruse beforehand. There are excellent descriptions of all the aspects of the doctor in the witness chair. He has certain privileges and certain obligations as a witness. He is very commonly called upon to give expert testimony which constitutes opinion evidence. There are chapters on the direct examination of the doctor witness, and on the cross-examination.

Insanity, workmen's compensation proceedings, and testimony in malpractice cases are reviewed. Stress is laid upon adequate preparation for trial or hearing, and how to be a good medical witness. Proposed improvements in the law concerning expert medical testimony is included. This book is recommended for reading by anybody who has occasion to appear as a witness in court on either side of the disputed issue.

—*FRANK P. GILMORE, Rear Adm., MC, USN*

SYSTEMIC ARTERIAL EMBOLISM, Pathogenesis and Prophylaxis, by *John Martin Askey*, M. D. 157 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1957. Price $5.75.

This brief monograph describes the various aspects of systemic arterial embolism. The early chapters discuss the problems of the risk, the morbidity and mortality, and the clinical correlations of arterial embolism; others consider the pathogenesis of cardiac mural thrombosis and systemic arterial embolism. Three chapters are devoted to

the diagnostic and prophylactic measures currently advisable in attacking the problem. The author has blended fact and theory into workable indications for and methods of treatment.

The book will be of value to the cardiologist, the internist, the general practitioner, the general surgeon, the cardiac surgeon, the thoracic surgeon, and the medical student, as well as all practicing physicians. It is concisely written but covers the subject of systemic arterial embolism in an excellent manner.

—RALPH D. ROSS, Capt., MC, USN

Collected Papers of THE MAYO CLINIC and The Mayo Foundation, edited by *Richard M. Hewitt,* B. A., M. A., M. D.; *John R. Miner,* B. A., M. A., Ph. D.; *M. Katharine Smith,* B. A.; *Carl M. Gambill,* A. B., M. D., M. P. H.; *Florence L. Schmidt,* B. S. E.; *George G. Stilwell,* A. B., M. D.; and *Guy Whitehead,* B. A., M. A., Ph. D. Volume 48, 1956. 778 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1957.

This is the forty-eighth volume of the series of annual reports of the staff of the Mayo Clinic and Foundation, and includes 712 new papers, 568 of which are referred to by title only. The book adequately covers most of the specialties and subspecialties of medicine and surgery. Many papers are presented in full, some by abridgment, and others in abstract form. The editors have selected material appropriately and have presented it well. The papers are of general interest to all physicians. Some contain new information, others present different, but well-thought-out views of controversial subjects, and, finally, interesting case reports are included.

This book is recommended for all general medical libraries. The general practitioner will find it useful in keeping abreast of some of the newer developments (its coverage is compact and broad); the specialist will read to his advantage those sections relating to his own field, and the remainder of the book he will find useful in keeping aware of the developments in the other fields of medicine. In this era of voluminous outpouring of medical writings, one finds it more and more necessary to resort to books which adequately abstract material in order to keep well read. This is one of those books.

—WILLIAM R. SCHILLHAMMER, Maj., MC, USA

CLINICAL PHYSIOLOGY, The Functional Pathology of Disease, edited by *Arthur Grollman,* M. D., Ph. D., F. A. C. P. 854 pages; illustrated. The Blakiston Division, McGraw-Hill Book Co., Inc., New York, N. Y., 1957. Price $12.50.

The great advances in modern medicine are a result of the application of physiologic instead of morphologic principles which were the bases for older clinical practice. No physician today can hope to practice or understand scientific medicine without a comprehension of the functional disturbance of underlying disease. This book meets admirably the long-felt need for a text which presents the functional pathophysiology of disease. The editor with the collaboration of 25 eminent clinicians has presented the subject in a lucid and authoritative manner.

All the contributors are not only in active practice but also are well known for their research accomplishments. The book is divided into 33 chapters and 9 parts, namely, general metabolic considerations, the cardiovascular, respiratory, digestive, hematopoietic, endocrine, renal excretory, locomotor systems, and infection and immunity.

Through careful editing and pruning, to which it obviously has been subjected, this work does not suffer from the usual defects common in books of multiple authorship. It has been kept within the bounds of utilizable text. It is difficult to say that one section is written better than another. However, certain chapters, such as "Vitamins in Health and Disease," by Dr. William B. Bean, were quite refreshing to the reviewer. The text is well balanced. The publisher's production and printing is commensurate with the high quality of the text. It is recommended to all physicians desirous of acquainting themselves with the scientific basis of medicine. The intern, resident, or practitioner preparing for his specialty board examination will also find the book of inestimable value. This text is ideal for the medical student to bridge the gap between the preclinical and clinical disciplines. The editor and his collaborators are to be congratulated for fulfilling this long-felt need in so practical and useful form.

—*ARCHIE A. HOFFMAN, Col., USAF (MC)*

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 67, Art. 8, pages 209-446, April 19, 1957. Editor-in-Chief, *Otto V. St. Whitelock.* "Viruses in Search of Disease." 237 pages; illustrated. The New York Academy of Sciences, New York, N. Y., 1957. Price $5.

This paper-bound volume consists of papers given at a conference held by the New York Academy of Sciences, Section of Biology, 24 and 25 May 1956. The chairman of the conference, and consulting editor of this volume, was *Robert J. Huebner.* Many notable names in virology are among the list of contributors. The contents are divided into five parts: Coxsackie viruses, new respiratory and ocular viruses, ECHO viruses, viral identification and classification, and criteria for etiologic association of prevalent viruses with prevalent diseases. The last part would have been better placed as an introductory section.

A volume of this kind is actually a glorified type of "minutes." There is much repetition and overlapping in the papers given by many of the contributors. It is questionable whether conferences of this type should be reprinted in a book form. Many of the papers contained reports on work in progress, some were speculative, many contributions were essentially repetitions of previously published material. After reading this volume, one is left with little practical information; and internists who keep up with advances in virology are unlikely to acquire *new* academic information. The book's scientific merit is, of course, unassailable because the contributors are of America's most prominent virologists. However, since it is in substance only an edited record of the meeting, it is probably of little interest except to the participants of the conference.—*ROBERT J. HOAGLAND, Col., MC, USA*

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ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 67, Art. 10, pages 671-894, May 9, 1957. Editor-in-Chief, *Otto V. St. Whitelock.* "Meprobamate and Other Agents Used in Mental Disturbances." 223 pages; illustrated. The New York Academy of Sciences, New York, N. Y., 1957. Price $4.

This book is a series of reports resulting from a meeting sponsored jointly by the divisions of biology and psychology of the New York Academy of Sciences in October 1956. The papers are divided into four sections. Part one considers the chemistry, pharmacology, and mode of action of meprobamate and other agents, and includes an article by Aldous Huxley, "The History of Tension," which is well worth reading several times. Part two contains five articles concerning treatment of psychoneurotic conditions with various tranquilizing agents. The authors of these articles are properly restrained in their enthusiasm for the drugs, and repeatedly advise against indiscriminate usage. Part three includes six reports on the treatment of psychiatric and other conditions with meprobamate. These include chronic psychiatric patients, senile psychosis, postoperative surgical care, alcoholism, chronic headache, and disturbed children. The authors of each of these articles report quite favorable results in treating the conditions discussed. Part four presents a series of papers on the use of meprobamate in muscle spasm. These include disorders of muscle tone, muscle spasm due to rheumatic conditions, skeletal muscle spasm, cerebral palsy, and the effect of meprobamate on basal ganglia (an experimental study on cats). The final report by R. W. Gerard summarizes the contents of the papers, and could with profit be read first as well as after reading the other papers.

This book is well organized. The papers are easily read and include brief bibliographies and excellently edited discussions. It is recommended for reading by clinicians.—*SAMUEL V. THOMPSON, Capt., MC, USN*

THE ELECTROCARDIOGRAM, Its Interpretation and Clinical Application, by *Louis H. Sigler,* M. D., F. A. C. P., F. C. C. P., F. A. C. C. 2d edition, revised. 312 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1957. Price $8.75.

This monograph on electrocardiography is a second edition of an earlier publication by the same author. It is an improvement over the first edition but contains nothing original or different from the current texts on the subject of the electrocardiogram. The chief purpose of this second edition as stated in the preface is to provide students taking an electrocardiography course with an up-to-date textbook, and it is therefore of benefit primarily for those who are concerned with the author's program of teaching. Although written as a recent edition, the author continues to use such terms as auricular flutter, fibrillation and tachycardia instead of using the more anatomic term atrial fibrillation, flutter, and tachycardia. The discussions on the electrocardiogram after stress are very unrealistic.

—*THOMAS W. MATTINGLY, Brig. Gen., MC, USA*

CRYPTORCHISM, by *Charles W. Charny,* M. D., and *William Wolgin,* M. D. 140 pages; illustrated. Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York, N. Y., 1957. Price $5.85.

In all of urology, there probably is no issue quite so controversial as that of the correct management of the undescended testis. In this monograph, the authors attempt to reconcile the various viewpoints on the subject. This is accomplished by a comprehensive review of the literature and also by presenting the results of their own unique investigations of the problem.

All phases of cryptorchism are exhaustively reviewed, including embryology, etiology, pathology, treatment, and end results. Emphasis is placed on the essentialness of testicular biopsy as the only accurate method of functional appraisal in unilateral cryptorchism. The authors present the results of 132 biopsies done on testes which had been brought down previously by various methods and technics, and state that in practically every case the testis was incapable of normal spermatogenesis. This is ascribed to postoperative atrophy and/or congenital dysgenesis, and apparently is independent of the method of treatment and the age at which treatment was carried out. Based on these observations, the authors adopt a rather nihilistic attitude toward the problem of unilateral cryptorchism (notwithstanding the report of Gross & Jewett), at least until present methods of surgical management can be improved upon.

Although the authors of this work do not claim or attempt to write the final verdict on the management of the undescended testis, they do go a long way toward clarifying the basic issues involved, and they very beautifully outline the path to be taken if order is ever to come out of the statistical chaos that now exists. There must be, first, accurate diagnosis; second, biopsies of both testes during orchiopexy; and finally, follow-up testicular biopsy when the child has passed adolescence. Not until this regimen is carefully followed out by all those willing to treat these patients, will the final answer be known.

This is an excellent review of the problem of cryptorchism, and should be read by anyone having occasion to diagnose or treat the condition.

—*HOWARD POLLACK, Capt., USAF (MC)*

DIAGNOSIS AND TREATMENT OF CARDIOVASCULAR DISEASE, 5th edition, in 2 volumes, edited by *William D. Stroud,* M. D., F. A. C. P., and *Morris W. Stroud, III,* M. D. Sixty contributors. Volume 1, chapters 1 through 29, pages 1 through 719; illustrated. Volume 2, chapters 30 through 53, pages 1,001 through 1,702; illustrated. F. A. Davis Co., Philadelphia, Pa., 1957. Price $35. per set of 2 volumes.

This two-volume work on the diagnosis and treatment of cardiovascular disease differs from the fourth (1950) edition in that loose-leaf binding has been adopted to handle revisions and additions as the editors deem necessary. Although the book is not intended to be encyclopedic, it makes a comprehensive general reference of 53 chapters

with an overlapping of subject material and the presentation of varying viewpoints. This can be confusing to the uninitiated student. In addition to the two editors, there are 59 contributors who are authorities in their special fields of interest.

The following chapters on congestive heart failure, digitalis, surgery of the heart and pericardium, coronary disease, disturbances of the heart beat, and psychosomatic aspects of cardiovascular disease were found to be exceptionally well done.

The student who believes that he is fully cognizant as to the management of the problem of elevated blood pressure is referred to at least four chapters on that subject. The type and format used make for easier reading as compared to the previous edition. The section on vascular diseases is comprised of 10 chapters and is excellent as far as it goes. The references found at the end of each chapter enhance considerably the value of the book.

The book does seem to have the fault of so many texts with multiple authorship, that is, a change of pace and viewpoint with the swing from the precise and affirmative to the indefinite and neutral. It is hoped the next revision will contain more data on vectorcardiography, phonocardiography, and cardiac catheterizations. All in all, this is one of the standard cardiology texts in American medicine and is recommended for inclusion in medical libraries.

—*ARCHIE A. HOFFMAN, Col., USAF (MC)*

BLOOD TRANSFUSION IN CLINICAL MEDICINE, by *P. L. Mollison*, M. D., M. R. C. P. 2d edition. 587 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1956. Price $9.

This volume is one of the most authoritative and readable I have seen on this subject. It is written by a doctor who has had many years of experience in the laboratory research phases of blood transfusions, and also with a keen appreciation of the clinical aspects of blood disorders and blood utilization. The book has long sections devoted to laboratory technic, including 61 pages on blood grouping. Approximately 100 pages describe blood incompatibility, which is described as "shortening of the life-span of red cells by iso-antibodies" found in either the recipient's or donor's plasma. This topic also includes 37 pages describing other unfavorable effects of transfusions.

The first chapter is concerned with the taking and storing of blood, and the survival of blood components after transfusion. In this section the author states that purine nucleosides are being studied in the hope of preserving blood for longer periods; but at present the rapid freezing of blood with glycerol will maintain red blood cells in good state up to 18 or more months. The rapid freezing technic must be combined with relatively rapid thawing when the blood is to be used.The freezing technic saves some space too, because most of the fluid part of the blood is removed. One point of clinical interest in connection with

blood storage is the fact that hemorrhagic phenomena have been seen in patients after large transfusions of stored blood since a deficiency of platelets accompanies the infusion.

The usual blood groups are described with the emphasis on the ABO system plus the Rh groups. However, the chapter on the Rh system is very detailed and too complicated for most clinicians to understand fully. One very interesting chapter, although quite detailed for the average physician, is the one on estimating survival time of red cells in normals and in disease conditions. One practical point brought out by Dr. Mollison is to question the "universal donor" regarding any recent injections as some, like hog pepsin, may stimulate anti-A bodies in the donor, and consequently cause reactions in the recipient. It was mentioned that, through studies with radioactive chromium, in hereditary spherocytosis cells were taken up by the spleen, while in sickle cell anemia, the red blood cells are taken up by the liver primarily. Regarding thalassemia major, the author reported that 50 per cent of transfusion cells were eliminated in five to nine days, but a splenectomy in these cases reduced the transfusion requirements down to one third or one half of the previous requirements. The last two chapters consider normal blood findings in newborn infants, the placental transfer of antibodies, and diseases of the newborn from the blood transfusion aspect. The book closes with 50 pages of references to world-wide literature.

I recommend this book highly for every hospital or large clinic as it is an outstanding reference for internists, pediatricians, and surgeons, as well as of more frequent value for the clinical laboratory officer. —*U. R. MERIKANGAS, Col., MC, USA*

BLOOD PRESSURE SOUNDS AND THEIR MEANINGS, by *John Erskine Malcolm*, B. Sc., M. B., Ch. B., F. R. C. S. 93 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $2.50.

This is a carefully written monograph on the physiologic mechanisms involved in the production of the sounds of Korotkov. Beginning with a review of past studies, the author describes his own work using the superior fidelity of the cathode ray oscilloscope. The technics described will be unfamiliar to most clinicians because they involve mathematical derivations. It is demonstrated that the sounds are caused by actual vessel excursions, the nature of which is dependent on basic principles of sound transmission through a system of nodes and antinodes. Normally nodes are points where the arteries are physically fixed by fascial structures. Despite this careful presentation, the meaning of these pressure-wave sounds takes on no additional significance in terms of the clinical management of cardiovascular disease. The book's sphere of interest is that of the physiologist as opposed to the cardiologist or general physician.

—*ROBERT B. DICKERSON, Lt. Col., MC, USA*

SIGNS AND SYMPTOMS, Applied Pathologic Physiology and Clinical Interpretation, edited by *Cyril Mitchell MacBryde*, A. B., M. D., F. A. C. P. 3d edition. 973 pages; 191 illustrations and 6 color plates. J. B. Lippincott Co., Philadelphia, Pa., 1957. Price $12.

This volume is a collection of monographs by some 28 outstanding medical authors. As the title implies, the chapters deal with clinical manifestations of disease; their mechanisms, variations, and implications. The chapter headings include pain, headache, clubbed fingers and hypertrophic osteo-arthropathy, cough, hemoptysis, dyspnea, and fainting. The text is easily understood, well organized and serves admirably the purpose of directing more attention toward the history and physical examination. This third edition has new chapters on growth and sex development, generalized vasospasm and arterial hypertension, and lymphadenopathy and diseases of the lymphatic system.

This is a real contribution to all clinicians. It is designed for ready reference and offers a physiologic approach to the understanding of symptoms and signs of disease. It is recommended to all physicians and medical students.—*R. J. PEARSON, Jr., Capt., MC, USN*

PROGRESS IN PSYCHOTHERAPY, edited by *Jules H. Masserman*, M. D., and *J. L. Moreno*, M. D. Volume 2, Anxiety and Therapy. 264 pages. Grune & Stratton, Inc., New York, N. Y., 1957. Price $7.50.

This volume consists of selected papers by 28 contributors which were presented in the 1956 meeting of the American Psychiatric Association, augmented by articles written by various experts in the field. The book is divided into six major sections, covering global psychotherapy, anxiety, special problems of stresses, schools and trends in psychotherapy, developments abroad, and a summation.

The first part is thought provoking, yet one cannot help being left with the feeling that the creation of a therapeutic world order is in many ways impractical because, as with individuals, "sick nations" may be unable to be convinced even by the pressure of world opinion that they are in need of therapy. Of considerable interest throughout the entire book in all sections is the evolution of the importance of situational factors and cultural settings in the condition of the anxiety syndrome. It is obvious from the tone of many of the chapters that psychiatrists must direct more and more attention to the ecology of the syndromes which they are called upon to treat, particularly in psychotherapy.

Many of the papers presented are of outstanding quality. All are stimulating and well worth reading. Of particular interest is a section on developments of psychotherapy in foreign lands. It would seem apparent that the technical approach to psychiatric problems is gaining impetus in countries whose thinking in psychiatry is primarily oriented toward a more biophysiologic approach to mental illness. Anyone with psychiatric background and training will find this group of papers stimulating and will discover something of value in nearly all of them.

—*ROY E. CLAUSEN, Jr., Lt. Col., MC, USA*

THE YEAR BOOK OF NEUROLOGY, PSYCHIATRY AND NEUROSURGERY (1956-1957 Year Book Series). Neurology, edited by *Roland P. Mackay*, M. D. Psychiatry, edited by *S. Bernard Wortis*, M. D. Neurosurgery, edited by *Oscar Sugar*, M. D. 596 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1957. Price $7.

This is a comprehensive condensation of the voluminous material recently added to the literature of the specialties of neurology, psychiatry, and neurosurgery. There are reviews and follow-up studies covering years of investigation for the busy doctor who is behind in his reading, and there is indispensable material for the well-read doctor who is staying up-to-date. Outstanding authorities cover the various subjects. The brevity of the material, together with the numerous illustrations, are assets of this Year Book.

This book is indexed for quick reference by the general practitioner as well as the resident preparing for board examinations. It's value is not limited to the specialist.—*JOSEPH J. HORNISHER, Col., MC, USA*

FUNDAMENTALS OF GENERAL SURGERY, by *John Armes Gius*, M. D., D. Sc. (Med.), F. A. C. S. 720 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1957. Price $12.50.

This book is designed for the novice and represents the author's conception of the presentation of surgery at the undergraduate level. The author is mindful of the magnitude of the medical field today and wisely omits details and confines his discussions to established principles and fundamentals essential to the proper comprehension and understanding of modern surgery based on sound physiologic and pathologic principles.

One highly commendable and necessary feature of this book is a very complete and up-to-date bibliography at the end of each chapter. Here the student is directed to specific articles or publications by recognized authorities which will supply the details necessarily omitted from the book. For the practicing surgeon the book will prove a stimulating and refreshing review of modern surgical principles. Particularly the early chapters should be most helpful in keeping the general man up-to-date in this rapidly advancing field. As a desk reference book it is lacking in details; however, the fundamental principles are all there and well presented. The book is full of "pearls of wisdom," briefly stated, which will evoke a chuckle from the experienced surgeon but might be missed by the novitiate.

It is realized that a line has to be drawn somewhere and that the author probably has very good reasons for omitting the genitourinary tract completely and, except for injuries, the bones, joints, chest, and nervous system. One wonders if, for completeness, these systems might have been briefly covered with profit. However, considering the obvious purpose of the book, it is very well done and is a modern and refreshing approach to an old subject. It would appear to be a valuable step in the right direction in adapting our undergraduate indoctrination to the demands of time and progress in the art of surgery.

—*PAUL E. SPANGLER, Capt., MC, USN*

CLINICAL PEDODONTICS, by *Sidney B. Finn,* D. M. D., M. S., and 7 contributors. 664 pages; illustrated with 275 figures. W. B. Saunders Co., Philadelphia, Pa., 1957. Price $12.

This comprehensive textbook on dentistry for children offers dentists practical information in the care of younger patients. It presents the broad field in a clear and easily readable style. Among the chapters that have been included are parent counseling, child management, oral diagnostic procedures, the problem of pain and sedation, cavity preparation in primary teeth, pulp treatment and root canal therapy, face development and tooth eruption, and preventive orthodontics and oral surgery for children.

The illustrations and tables presented are well chosen and are reproduced in an excellent manner. Particularly good are the tables listing disorders that affect the skull, the skin and hair, facial symmetry, the breath, lips, buccal mucosa, gingiva, tongue, tooth eruption, and occlusion. These and others offer a ready reference for diagnosis and treatment planning. This book is superior in quality and can be recommended for serious consideration to those who teach undergraduate students and to general practioners who wish to keep abreast of the newer concepts and technics in this broad field.

—*GEORGE H. PARROT, Jr., Lt. Col., DC, USA*

ATLAS OF NEUROPATHOLOGY, by *Nathan Malamud,* M. D. 468 pages; 226 pages of photographs; 2 pages of color plates. University of California Press, Berkeley 4, Calif., 1957. Price $20.

This atlas provides an extensive reference to the pathology of the nervous system. The author's work is well known to many students and graduates who have attended his classes in neuropathology or the review course he gives periodically for neurologists and psychiatrists preparing for the board examinations. The 10 chapters cover the gamut of pathologic conditions and include a chapter on cytology and cellular pathology which will help orient the reader to the special stains used in the nervous system. One chapter is devoted to the sequelae of perinatal and postnatal disorders. Dr. Malamud has been a United States Public Health Service investigator in the problems of cerebral palsy and is well qualified to discuss these often neglected entities.

There are 226 pages of photographs. It is unfortunate that there are only two pages of color photographs. The characteristics of the various entities are discussed and illustrative cases are presented on the pages facing the photographs, thus providing a quick synopsis of the condition being considered. The photographs include pictures of the gross and microscopic characteristics and various stains, and magnifications are used to illustrate typical lesions. Students and graduates will find this a most useful reference, providing the most complete coverage available in neuropathology.

—*ROBERT L. WILLIAMS, Maj., USAF (MC)*

THE YEAR BOOK OF PATHOLOGY AND CLINICAL PATHOLOGY (1956-57 Year Book Series), edited by *William B. Wartman*, B. S., M. D. 510 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1957. Price $7.

The selection and abstracting of important articles in any medical specialty is not an easy task, but Dr. Wartman and his staff continue to do an excellent job in the fields of pathology and clinical pathology. The abstracts are taken from articles published during 1956 and are, as in the past, grouped according to content under the various major headings (systems in pathology and subspecialties in clinical pathology). Dr. Wartman's analytical mind and keen sense of humor are repeatedly demonstrated by his numerous editorial notes and by the reprinting of a special article from *Lancet* entitled "On the Classification of Unicorns."

As in the past the publishers continue to use a good binding with high-grade paper and have reproduced the illustrations in a clear and precise manner. This handbook can be recommended to all who are interested in keeping abreast of the times in pathology and clinical pathology. It is a must for all practicing pathologists.

—*BRUCE H. SMITH, Capt., MC, USN*

PSYCHIATRY IN THEORY AND PRACTICE, by *Beulah Chamberlain Bosselman*, M. D. 150 pages. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $4.

The author of this small volume has achieved a clearly understandable coverage of present-day psychiatric concepts. The reader experiences the feeling that he is listening to a highly competent, skillful, and well-trained lecturer who knows the subject well and who speaks with the confidence of an authority. Dr. Bosselman has included a concise picture of the identifiable psychiatric entities with details as to historical origin, dynamic formulations, and differential diagnoses. As an added bonus the therapeutic goals are discussed. A notable omission, in my opinion, was the author's failure to discuss the use of electroconvulsive therapy in schizophrenia. Its use for the treatment of severely withdrawn or excited schizophrenics is still an old standby in many institutions in spite of the advent of tranquillizing drugs.

This volume provides enjoyable as well as authoritative reading and, even though the author's views may not always coincide with the reader's pet theories on specific aspects of psychiatric practice, I predict that one will be so impressed with the sincere and honest effort to cover the highly complicated problem of clinical psychiatry in such limited space that he will end up praising instead of criticizing. This book should prove to be particularly useful as an introduction to the study of psychiatry or for quick review. Psychiatric residents, psychologists, social workers, and physicians in general interested in psychiatry should find this book exceptionally valuable. —*STEPHEN MOURAT, Lt. Col., MC, USA*

A TEXTBOOK OF HISTOLOGY, by *Alexander A. Maximow*, Late Professor of Anatomy, University of Chicago, and *William Bloom*, Professor of Anatomy, University of Chicago, 7th edition. 628 pages; 1,082 illustrations, 265 in color, on 631 figures. W. B. Saunders Co., Philadelphia, Pa., 1957. Price $11.

This textbook is known to almost a generation of physicians and biologists as a standard reference. It was a new book when I studied it as a student in 1931 and the difference between that dog-eared copy and the current edition is instructive. This edition is some 200 pages shorter, yet the number of the very excellent illustrations is almost doubled. The keynote of the text is found in the following quotation from the preface: "...Vistas of the submicroscopic world have come into view and an exciting chapter is beginning with the fusion of some aspects of biochemistry and biophysics with histology.... It is thus necessary to present medical students with an orienting text which not only describes the structure of the human body as seen with the optical microscope but which also considers relevant submicroscopic analysis and discusses function." This outlook has produced an admirable blend of the old and the new. This edition will be a required reference for all those who do serious microscopy at whatever level they may be in their educational process.

—*WILLIAM D. TIGERTT, Col., MC, USA*

PHYSIOPATHOLOGY OF THE RETICULO-ENDOTHELIAL SYSTEM, A Symposium organized by The Council for International Organizations of Medical Sciences, established under the joint auspices of UNESCO and WHO. Edited under the direction of *B. N. Halpern, B. Benacerraf*, and *J. F. Delafresnaye*. 317 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $9.

This symposium collected some of the most recent data on the reticuloendothelial system, which includes phagocytic activity, metabolic function, and the role against bacterial infections. There are much detailed data of little use to the practicing pathologist, but the chapters on morphology and physiology of the histiocytes, the role of the reticuloendothelial system in iron metabolism, and the means by which the reticuloendothelial system combats bacterial invasion and neutralizes toxins brings together information which has come out piecemeal in the last few years. The data help to correlate morphology with physiology and create interest in the system which the clinical pathologist sees in his daily work. The work also emphasizes the need of re-evaluating and correlating our knowledge every so often in order to see how our concepts and definitions have broadened. What is the reticuloendothelial system? This symposium makes one realize that the definition is not so clear and that the limits depend upon who defines it. The book is written in English with the introduction and the résumés in French. It should be of interest to all physicians, especially the internist and clinical pathologist and those working in both experimental and clinical medicine.

—*PAUL C. LeGOLVAN, Lt., Col., MC, USA*

New Books Received

Books received by the *U. S. Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be reviewed in a later issue.

BONE DISEASES in Medical Practice, by *I. Snapper,* M. D. 229 pages; with 24-page section of 48 plates. Grune & Stratton, Inc., New York, N. Y., 1957. Price $15.

BONE TUMORS, General Aspects and an Analysis of 2,276 Cases, by *David C. Dahlin,* M. D. 224 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $11.50.

ORTHODONTICS: Practice and Technics. Companion Volume to Orthodontics: Principles and Prevention. By *J. A. Salzmann,* D. D. S., F. A. P. H. A. 497 pages; 471 illustrations and 34 tables. J. B. Lippincott Co., Philadelphia, Pa., 1957. Price $20. (This book and its companion volume, "Orthodontics: Principles and Prevention," are available in a slip case at $33 for the set.)

ORTHODONTICS: Principles and Prevention. Companion Volume to Orthodontics: Practice and Technics. By *J. A. Salzmann,* D. D. S., F. A. P. H. A. 381 pages; 262 illustrations and 26 tables. J. B. Lippincott Co., Philadelphia, Pa., 1957. Price $13. (This book and its companion volume, "Orthodontics: Practice and Technics," are available in a slip case at $33 for the set.)

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 65, Art. 6, Pages 653-1146, August 9, 1957, editor-in-chief, *Otto V. St. Whitelock.* "The Electrophysiology of the Heart." Conference Chairman and Consulting Editor, *Hans H. Hecht.* 493 pages; illustrated. The New York Academy of Sciences, New York, N. Y., 1957. Price $4.50.

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 68, Art. 1, pages 1-244, August 30, 1957. Editor-in-chief: *Otto V. St. Whitelock.* "Proteolytic Enzymes and Their Clinical Application." Consulting Editor and Conference Chairman: *Gustav J. Martin.* 244 pages; illustrated. The New York Academy of Sciences, New York, N. Y., 1957. Price $3.50.

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 68, Art. 2, Pages 245-656, October 21, 1957, editor-in-chief, *Otto V. St. Whitelock.* "Subcellular Particles in the Neoplastic Process." Consulting Editor, *Cornelius P. Rhoads.* 411 pages; illustrated. The New York Academy of Sciences, New York, N. Y., 1957. Price $5.

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 69, Art. 1, pages 1-254, Sept. 7, 1957. Editor-in-chief: *Otto V. St. Whitelock.* "Biological Applications of Infrared Spectroscopy." Conference Co-Chairmen: *Robert P. Bauman* and *Carl Clark.* Consulting Editor: *Robert P. Bauman.* 253 pages; illustrated. The New York Academy of Sciences, New York, N. Y., 1957. Price $3.50.

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 69, Art. 2, pages 255-376, August 30, 1957. Editor-in-chief: *Otto V. St. Whitelock.* "Modern Ideas on Spontaneous Generation." Conference Chairman and Consulting Editor: *Ross F. Nigrelli.* 120 pages; illustrated. The New York Academy of Sciences, New York, N. Y., 1957. Price $2.50.

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 69, Art. 3, Pages 377-524, October 12, 1957, editor-in-chief, *Otto V. St. Whitelock.* "Second Conference on Sulfonamides." Consulting Editor, *Perrin H. Long.* 147 pages; illustrated. The New York Academy of Sciences, New York, N. Y., 1957. Price $3.

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 70, Art. 1, pages 1-152, August 30, 1957. Editor-in-chief: *Otto V. St. Whitelock.* "The Role of I^{131}-Labeled Proteins in Biology and Medicine." Conference Chairman and Consulting Editor: *S. P. Masouredis.* 152 pages; illustrated. The New York Academy of Sciences, New York, N. Y., 1957. Price $3.

IMPLANT DENTURES, Indications and Procedures, by *Aaron Gershkoff,* B. S., D. D. S., and *Norman I. Goldberg,* D. D. S. Foreword by *Irving R. Hardy,* D. M. D. 256 pages; 327 illustrations and 1 color plate. J. B. Lippincott Co., Philadelphia, Pa., 1957. Price $12.

GENERAL TECHNIQUES OF HYPNOTISM, by *André M. Weitzenhoffer,* Ph. D. 460 pages. Grune & Stratton, Inc., New York, N. Y., 1957. Price $11.50.

INTRODUCTION TO CLINICAL ENDOCRINOLOGY, by *A. Stuart Mason,* M. A., M. D. 192 pages. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $4.50.

THE PRINCIPLES AND PRACTICE OF DIATHERMY, by *Bryan O. Scott,* M. R. C. S., L. R. C. P., D. Phys. Med. 193 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $5.

THE INFANTILE CEREBRAL PALSIES, by *Eirene Collis,* et al. 100 pages. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $3.

QUANTITATIVE PHARMACEUTICAL CHEMISTRY, by *Glenn L. Jenkins,* Ph. D.; *John E. Christian,* Ph. D.; and *George P. Hager,* Ph. D. 5th edition. 552 pages; illustrated. The Blakiston Division, McGraw-Hill Book Co., Inc., New York, N. Y., 1957. Price $8.50.

PUBLIC HEALTH NURSING PRACTICE, by *Ruth B. Freeman,* R. N., Ed. D. 2d edition. W. B. Saunders Co., Philadelphia, Pa., 1957. Price $5.

THE PSYCHOLOGY OF GAMBLING, by *Edmund Bergler,* M. D. 244 pages. Hill and Wang, Inc., New York, N. Y., 1957. Price $3.95.

CLINICAL ORTHODONTICS, A Guide to the Sectional Method, by *Bercu Fischer,* D. D. S. 478 pages; 1332 illustrations on 354 figures. W. B. Saunders Co., Philadelphia, Pa., 1957. Price $17.

THE RETICULAR FORMATION OF THE BRAIN STEM, Anatomical Aspects and Functional Correlations, by *Alf Brodal,* M. D. The Henderson Trust Lectures, Publication No. XVIII. 87 pages; 23 illustrations including 5 plates. Published for The William Ramsay Henderson Trust by Oliver & Boyd, Edinburgh and London, and Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $3.

THE DOCTOR EYES THE POOR READER, by *Delwyn G. Schubert,* B. S., M. S., Ph. D. 101 pages. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $3.75.

CORTISONE IN DENTISTRY, by *Lyon P. Strean,* M. Sc., Ph. D., D. D. S., F. A. P. H. A. 178 pages; 57 illustrations. Dental Items of Interest Publishing Co., Inc., Brooklyn, N. Y., 1957. Price $5.95.

AN INTRODUCTION TO ELECTROCARDIOGRAPHY, by *L. Schamroth,* M. B., B. Ch. (Rand), M. R. C. P. E., F. R. F. P. S. 60 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $2.50.

TECHNIQUE OF FLUID BALANCE, Principles and Management of Water and Electrolyte Therapy, by *Geoffrey H. Tovey,* M. D. 100 pages. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $2.50.

INTRODUCTION TO ANESTHESIA, The Principles of Safe Practice, by *Robert D. Dripps,* M. D.; *James E. Eckenhoff,* M. D.; and *Leroy D. Vandam,* M. D. 266 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1957. Price $4.50.

THE MICROBIAL WORLD, by *Roger Y. Stanier, Michael Duodoroff,* and *Edward A. Adelberg.* 682 pages; illustrated. Prentice-Hall, Inc., Englewood Cliffs, N. J., 1957. Price $8.

SYMPOSIUM ON NUTRITION AND BEHAVIOR, Nutrition Symposium Series No. 14. Proceedings of a Symposium held at the University of Minnesota, School of Public Health, Laboratory of Physiological Hygiene, Minneapolis, Minnesota, April 27, 1956. *Josef Brožek,* Guest Editor. The National Vitamin Foundation, Inc., New York, N. Y., March 1957. Price $2.50.

THE PHYSICIAN'S OWN LIBRARY, Its Development, Care and Use, by *Mary Louise Marshall.* American Lecture Series. Publication No. 312, A Monograph in American Lectures in Internal Medicine, edited by *Roscoe L. Pullen,* A. B., M. D., F. A. C. P. 87 pages. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $3.

THE CHRONICALLY ILL, by *Joseph Fox,* Ph. D. 229 pages. Philosophical Library, Inc., New York, N. Y., 1957. Price $3.95.

LABORATORY APPLICATIONS IN CLINICAL PEDIATRICS, by *Irving J. Wolman,* M. D. 1019 pages. The Blakiston Division, McGraw-Hill Book Co., Inc., New York, N. Y., 1957. Price $15.

BODY WATER IN MAN, The Acquisition and Maintenance of the Body Fluids, by *Maurice B. Strauss,* M. D. 286 pages; 31 illustrations. Little, Brown & Co., Boston, Mass., 1957. Price $7.

PSYCHOLOGICAL DISORDER AND CRIME, by *W. Lindesay Neustatter,* M. D., B. Ss. (psy.), M. R. C. P. 248 pages. Philosphical Library, Inc., New York, N. Y., 1957. Price $6.

SURGERY OF THE BILIARY TRACT, PANCREAS & SPLEEN, by *Charles B. Puestow,* M. D., Ph. D. (Surg.) 2d edition. A Handbook of Operative Surgery. 381 pages; illustrated by *Jessie W. Phillips.* The Year Book Publishers, Inc., Chicago, Ill., 1957. Price $9.75.

HOST-PARASITE RELATIONSHIPS IN LIVING CELLS, A Symposium, Sponsored by The James W. McLaughlin Fellowship Program, University of Texas, Medical Branch, Galveston, Texas, April 27, 1956. Compiled and edited by *Harriet M. Felton,* M. D. 245 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $6.50.

DIGITALIS, Compiled and edited by *E. Grey Dimond,* M. D. 255 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $7.

ROOTS OF MODERN PSYCHIATRY, Essays in the History of Psychiatry, by *Mark D. Altschule,* M. D. 185 pages. Grune & Stratton, Inc., New York, N. Y., 1957. Price $5.75.

THE HANGOVER, A Critical Study in the Psychodynamics of Alcoholism, by *Benjamin Karpman,* M. D. 531 pages. Illustrations by *Wesley R. Wilken.* Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $9.50.

INTEGRATING THE APPROACHES TO MENTAL DISEASE, Two Conferences Held under the Auspices of the Committee on Public Health of The New York Academy of Medicine, edited by *H. D. Kruse,* M. D. 393 pages. Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York, N. Y., 1957. Price $10.

THE YEAR BOOK OF MEDICINE (1957-1958 Year Book Series). Six Departments. Part I, Infections, by *Paul B. Beeson,* M. D.; Part II, The Chest, by *Carl Muschenheim,* M. D.; Part III, The Blood and Blood-Forming Organs, by *William B. Castle,* M. D.; Part IV, The Heart and Blood Vessels and the Kidney, by *Tinsley R. Harrison,* M. D.; Part V, The Digestive System, *Franz J. Ingelfinger,* M. D.; and Part VI, Metabolism, by *Philip K. Bondy,* M. D. 752 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1957. Price $7.50.

A DICTIONARY OF SCIENTIFIC TERMS, Pronunciation, Derivation, and Definition of Terms in Biology, Botany, Zoology, Anatomy, Cytology, Genetics, Embryology, Physiology, by *I. F. Henderson,* M. A., and *W. D. Henderson,* M. A., B. Sc., Ph. D., F. R. S. E. 6th edition, by *J. H. Kenneth,* M. A., Ph. D., F. R. S. E., F. R. S. G. S. 532 pages. D. Van Nostrand Co., Inc., Princeton, N. J., 1957. Price $12.50.

THE GLAUCOMAS, by *H. Saul Sugar,* M. D., F. A. C. S. 2d edition 516 pages; illustrated. Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York, N. Y., 1957. Price $13.50.

THE CLINICAL APPLICATION OF ANTIBIOTICS, by *M. E. Florey,* M. D. Volume III, Chloramphenicol and the Tetracyclines. 393 pages; illustrated. Oxford University Press, New York, N. Y., 1957. Price $19.50.

MANUAL OF NUTRITION, 4th edition. Originally written in Great Britain in 1945 by *Dr. Magnus Pyke,* Ph. D., F. R. I. C. 68 pages. Philosophical Library, Inc., New York, N. Y., 1957. Price $3.50.

TUMOR SURGERY OF THE HEAD AND NECK, by *Robert S. Pollack,* M. D., F. A. C. S. 101 pages; 112 illustrations on 49 figures. Lea & Febiger, Philadelphia, Pa., 1957. Price $5.

CHILD PSYCHIATRY, by *Leo Kanner,* M. D. With prefaces by *John C. Whitehorn,* M. D., *Adolf Meyer,* M. D., LL. D.; and *Edwards A. Park,* M. D. 3d edition. 777 pages. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $8.50.

OPERATIVE OBSTETRICS, by *R. Gordon Douglas* and *William B. Stromme.* Foreword by *Nicholson J. Eastman.* 735 pages; illustrated. Appleton-Century-Crofts, Inc., New York, N. Y., 1957. Price $20.

FEAR: Contagion and Conquest, by *James Clark Moloney,* M. D. 140 pages. Philosophical Library, Inc., New York, N. Y., 1957. Price $3.75.

MAY'S MANUAL OF THE DISEASES OF THE EYE For Students and General Practitioners. 22d edition, revised and edited by *Charles A. Perera,* M. D. 518 pages; 378 illustrations including 32 plates with 93 colored figures. The Williams & Wilkins Co., Baltimore, Md., 1957. Price $6.

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